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January 30, 1995, Vol. 29, No. 5, 116 Pages, $6/Copy, $48/Year

COMPUTERWORLD

EMC recasts RAID

By Craig Stedman

Would RAID by any other name smell as sweet?

EMC Corp. confirmed last week that it will try to answer that question in the third quarter by outfitting its fast-selling Symmetrix mainframe disk arrays with a hybrid version of RAID. The hybrid is the redundant storage technology.

EMC said users will be able to split their Symmetrix boxes into pieces that could be separately configured with the upcoming RAID-S or the disk mirroring and dynamic sparing approaches it already offers.

In addition, sources familiar with the company's plans said both 3380 and 3390 data formats will also eventually be supported in a single array.

> EMC has gone from nowhere to No. 2 in the mainframe disk market in just three years

Users and analysts

EMC, *page 113*

NT Server jumps on PowerPC bandwagon

By Laura DiDio

Microsoft Corp. last week revealed that it is set to beta-test an enhanced version of its Windows NT Server that will add much-anticipated support for the IBM PowerPC server platform, PCMCIA adapters and file compression capabilities.

The forthcoming NT Server 3.51 upgrade will ship to beta sites in the first quarter and may ship in volume during the second quarter, said Mike Nash, Microsoft's group product manager for Windows NT.

One feature that will not be bundled into NT Server 3.51 is support for Novell, Inc.'s NetWare. Instead, the upgrade will support NetWare as a separate option that will be "priced competitively," Nash said.

Users and analysts familiar with the 3.51 release gave its new features a thumbs-up — especially support for the PowerPC platform. The enhancements will bolster Microsoft's already strong presence as a provider of application and database servers, they said.

"Support for the IBM PowerPC ... is really nice," said Randy Dugger, director of information systems at Liposome Technology, Inc., a Menlo Park, Calif., pharmaceuti-

NT Server, *page 113*

In Depth

OpenDoc *vs.* OLE/COM

OpenDoc supporter Cliff Reeves says OLE/COM has all the technical sophistication of a Neanderthal. Newly shipping OpenDoc can claim to be more elegant, but it hasn't proved anything yet, counters OLE/COM backer Robert Blemuth. The two square off beginning on page 86.

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Support and maintenance costs

Making the deal

By Kim S. Nash

This does not have to happen to you.

Support costs for the Alberta Cancer Board's four Sybase, Inc. database licenses jumped to $97,000 in 1994, up 45% from its $67,000 bill in 1993.

Two evils lurked behind that $30,000 hike, said Felix Fridman, director of information systems at the Edmonton, Alberta-based health care agency: Sybase changed its support programs, and the agency moved from mainframe computing to Unix and Microsoft Corp.'s Windows NT.

But users in similar situations do not have to bleed money in the form of maintenance payments. In fact, some large sites have found smarter ways to negotiate software support contracts and cut their bills by half or two-thirds. That is a pretty penny, considering that the 1994 Computerworld Premier 100 companies spent an average of 47% of their annual software budgets on maintenance and support.

"Despite what vendors may have you believe, maintenance fees are not written in stone or even mud. Everything's negotiable," said Bill Zeitz, president of Zeitz and Associates, a New York consulting firm.

Indeed, squeezing a better deal out of Oracle Corp., a notorious negotiator, was Zeitz's last

Making the deal, *page 16*

Lotus cut estimated retail prices for Notes and expanded the range of client choices

$100 Notes Express
Entry-level Notes client; provides client/server E-mail.

$155 Notes Desktop
New runtime executable for client; runs with any Notes server or application.

$155 AT&T's Network Notes*
Expected runtime client for access to an AT&T Network Notes server.

$275 Notes
Classic Notes; offers full client/server capabilities.

*Lotus has not announced official pricing or positioning for AT&T's Network Notes. Price is based on estimate from International Data Corp. in Framingham, Mass.

Lotus drops prices to build Notes base

By William Brandel

Emboldened by Microsoft Corp.'s delays in delivering its Exchange Server, long touted as a "Notes killer," Lotus Development Corp. last week launched a blitz of price cuts and bundling arrangements. The moves were designed to persuade corporate sites to take Notes beyond the pilot stage.

Perhaps most significant among the announcements was Lotus' capitulation to user demands for a runtime client version of Notes. With an expected street price of $120, the software does not include the application development and administration capabilities found in the full-blown client (see chart above). Lotus also dropped the price of the client/server version of Notes from $330 to $275.

Users now have a choice of pricing options for Notes in addition to a wide range of plat-

Lotus, *page 14*

Info-terrorist threat growing

By Gary H. Anthes
MONTREAL

Your company has state-of-the-art information security programs — virus scanners, data encryption and an Internet firewall.

But what are you doing about HERF guns and EMPT bombs?

High Energy Radio Frequency guns and Electromagnetic Pulse Transformer bombs are devices — akin to microwave ovens — designed to aim electromagnetic radiation at a target. They were among the items on a grim list of devices highlighted at the recent National Computer Security Association's "Information Warfare" conference here.

The majority of information systems managers pay scant attention to the threat of electromagnetic weapons. Indeed, the notion that a company's computers or communications systems are at risk from an info-terrorist toting a portable Star Wars device seems far-fetched to many.

But a growing number of information security experts say it is just a matter of time before a disgruntled employee, extortionist or terrorist zaps megawatts of energy into a hapless data center and turns mission-critical information into digital mush.

Info-terrorists, *page 28*

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What's Inside

January 30, 1995

Unlikely Allies

First it was Michael Jackson and Lisa Marie Presley. Now the stress and strain of downsizing, reengineering and restructuring are turning HR and IS managers like Georgia-Pacific's Gwen Barker and Rick Partridge into...

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NEWS

- **Cincom** drops plans for a distributed version of its Supra database in favor of an object/relational hybrid. *Page 4*
- **Compaq** had a record year in the market, but for Wall Street, just being No. 1 isn't good enough. *Page 6*
- The judge reviewing the **Microsoft antitrust** case isn't about to use a rubber stamp. *Page 6*
- Microsoft plans to pair releases of desktop **Windows** and Windows NT in 1996. *Page 7*
- Silicon Graphics announces an all-in-one Internet **document-authoring** system. *Page 10*

DESKTOP COMPUTING

- The response is muted for **Intel's Pentium** upgrade. *Page 41*

WORKGROUP COMPUTING

- Products based on Lotus' Notes integrate **E-mail and voice-mail** services. *Page 47*

ENTERPRISE NETWORKING

- Cisco promotes a standard allowing **internetworking products** to share configuration information. *Page 51*

LARGE SYSTEMS

- **IBM's new sales** organization was met with applause from customers who hope the computer giant will get to know their businesses better. *Page 57*

APPLICATION DEVELOPMENT

- High-end **client/server tools** vendors take note of Microsoft's Visual Basic users. *Page 63*

MANAGEMENT

- An **IS executive** tells why she still likes computers better than her business colleagues. *Page 72*

CAREERS

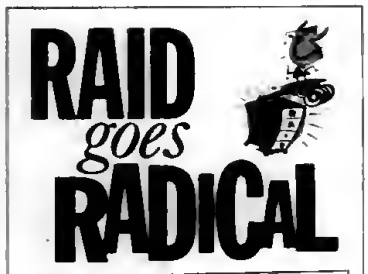
- A **mainframe programmer** quiets his fears and steps into Windows development. *Page 91*

COMMENTARY

- **Charles Babcock** says don't discount or discard the mainframe too early. *Page 8*
- **Paul Gillin** advises readers not to overlook all the good things Borland has done. *Page 36*
- **Michael Cohn** offers a test for CIOs to determine whether they should look for a raise or their resumes. *Page 37*
- **Esther Dyson** says partners in virtual corporations must effectively share information. *Page 37*

How do you measure up?

How does your IS department compare with the Computerworld Premier 100? Fill out the Premier 100 survey, and we'll send you a free report showing how your operation compares with Premier 100 averages. Consolidated information from the surveys we collect may be published in a future Premier 100 issue. Send a request on company letterhead to Paul Gillin, Editor, Computerworld, 375 Cochituate Road, Framingham, Mass. 01701 or E-mail to survey@cw.com.



Once a fail-safe alternative for a small part of a company's critical data, RAID devices are overtaking traditional storage systems at all levels. For user analysis of the choices in large system, midrange and server RAID devices, see the CW Guide to RAID Storage Devices, page 77, and Marketplace, page 102.

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Executive Briefing

Users don't have to bleed money for software maintenance costs if they muscle vendors into signing more flexible support contracts. Some large sites have found **smarter ways to negotiate** software support contracts and cut their bills by half or two-thirds. *Page 1*

Information warfare specialists warn that risks from info-assassins are growing. Devices such as HERF guns were among a grim list of computer-disabling devices highlighted at a recent computer security conference. Experts say the majority of IS **managers pay scant attention** to such threats from electromagnetic weapons. *Page 1*. Meanwhile, two new breaches on the Internet highlight the need for **tighter security.** *Page 12*

Lotus slashes prices in an effort to persuade corporate sites to take Notes from product pilot to groupware standard. **One of the** most significant moves by Lotus was its capitulation to user demands for a runtime client version for Notes. That client package is expected to carry a street price of $120. *Page 1*

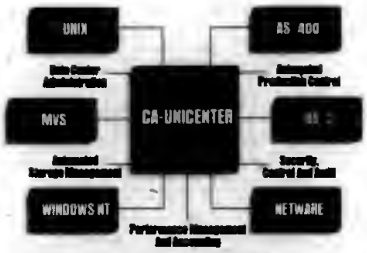
Computer Associates' Chairman and CEO Charles B. Wang says his company has **shifted its focus** from pure sales to maintaining relationships with customers. *Page 16*

The meshing of Mobil Research & Development's business and technology directives — through which Mobil links its R&D strategy with its customers' plans — is one example of how organizations can better leverage their technology investments, as shown at a recent gathering of **The Conference Board.** *Page 24*

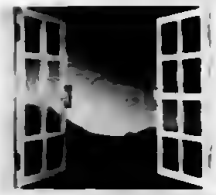
On site this week: When **Texas Commerce Bank** added a new 401K business unit, **workflow** was at the heart of the system design. *Page 47*. Videoconferencing is key to **Modern Engineering**'s becoming a worldwide supplier of automotive engineering services. *Page 32*. Medical products company **The Darby Group** rearchitected its IS operation; trimming down its mainframe complex while boosting PC and LAN use. *Page 42*. **Ogden Projects** has been energized by an AS/400-based imaging system. *Page 57*

The 5th Wave *by* Rich Tennant

1. Standardise On A Common GUI Interface That Makes It Easier To Use, Reduce Training Costs And Boost Productivity.



3. Choose A Client/Server Application That's Interoperable, Scalable and Portable.



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Cincom sidelines Supra database

By Rosemary Cafasso and Craig Stedman

Cincom Systems, Inc. in saying hello to object database technology and goodbye to the long-delayed distributed version of its Supra Server relational database. And some Supra users are wondering what to say in return.

Marco Emrich, senior director of the advanced technology group at Cincom, confirmed last week that the Cincinnati-based company has dropped plans to market Supra Server Version 3.0, except to the federal government. Instead, it is substituting an object/relational hybrid based on technology from Unisql, Inc. in Austin, Texas. The hybrid, referred to internally as the Total Object Hub, entered production this month, according to Emrich.

Even the government release of Supra 3.0, which was renamed Supra 127 when it shipped last September, will be replaced after Cincom adds support for the Federal Information Processing Standard 127 specifications to the Unisql-based product, Emrich said. He did not say when that will occur.

Supra 3.0 was originally due in 1992 (see box), but Cincom ran into engineering and testing delays and eventually revisited its strategy, Emrich said. Acknowledging its bit presence in the Unix database market, the company switched to the Unisql technology because it can work in environments with databases from multiple vendors, he added. Supra 3.0, on the other hand, would have required customers to standardize on that product at all sites.

In the dark

Yet several Cincom customers who were looking forward to the distributed capabilities that Supra 3.0 was supposed to provide — such as protected two-phase commit and access to data tables at different sites — said the new object-based approach remains a bit of a mystery.

"It can't comment on a strategy that hasn't been articulated," said David Sacco, MIS manager at the rolled products division of Alcan Aluminum Corp. in Cleveland. Cincom has not laid out a clear migration path from Supra Server 2.x to the Unisql-based product, and Alcan is "impatient and actively pursuing other alternatives" for future database purchases, he added.

"It looked like they had a good thing going" with Supra 3.0, said Craig Lincoln, manager of information services at Star Cutter Co., a maker of metal cutting and drilling tools in Farmington Hills, Mich. Total Object Hub has potentially long-term interest for Star Cutter, but object technology as a whole "is still a very general concept in our minds," he said.

Samuel Smith Jr., senior engineering programmer/analyst at the Sonoma County Water Agency in Santa Rosa, Calif., said it is also taking a cautious approach to objects. "We're still waiting to see how it all shakes out, not just at Cincom but in the industry," he said.

While Supra 3.0 has been jettisoned, the older Supra 2.x will continue to be enhanced, Emrich said. A Supra 2.7 release is due in May with disk striping and performance monitoring features.

Peter Storer, an analyst at Atre Associates, Inc. in Port Chester, N.Y., said Supra 3.0 was Cincom's great hope for competing with the heavyweights of the Unix database world. "They had some really slick technology in there," he said. "It's a shame to see that go away."

However, Richard Finklestein, president of Performance Computing, Inc. in Chicago, noted that the distributed approach of Supra 3.0 was superseded by technology for replicating central databases to remote sites.

The perils of Supra Server 3.0

June 1992	Promised introduction in October 1992
November 1992	Introduction delayed until March 1993
May 1993	Delivery promised in fourth quarter of 1993
September 1994	Shipped for government users only
January 1995	Object/relational database hybrid released as replacement for Supra

Corrections

Due to an editing error, the Dec. 19, 1994, "Guide to Business Intelligence Software" incorrectly cited Information Resources, Inc. as the vendor of Express. The product is now sold by IRI Software, a separate company.

Due to a reporting error in the Sept. 12, 1994, issue, Online 10Base-T Security Module was incorrectly listed as being produced by 3Com Corp. The product is produced by Chipcom Corp.

In the story "IBM's kernel pops" (CW, Jan. 9), David Pinkard, a technical analyst at Mallinckrodt Medical, Inc., was erroneously identified as David Mallinckrodt.

Racotek offers wireless 'Key'

Environment allows transparent messaging across incompatible networks

By Michael Fitzgerald

Valentine's Day should mark a major breakthrough for corporate IS managers who have been flirting with the concept of deploying wireless data services.

That is when Racotek, Inc. in Minneapolis will announce KeyWare, a messaging environment that appears to hand information systems managers a wireless bouquet.

KeyWare will provide a common application programming interface (API) designed to let users send messages transparently over incompatible networks, sources close to the company said. Racotek will announce the product at Networks Expo-Boston on Feb. 14-16, the sources said.

According to today's issue of Andrew Seybold's "Outlook on Computing and Communications," a newsletter in Brookdale, Calif., KeyWare is "an open, scalable Wireless Distributed Computing environment" similar to the Distributed Computing Environment.

KeyWare supports Cellular Digital Packet Data (CDPD), Ram Mobile Data USA, L.P.'s Mobitex network and Ardis Co.'s Advanced Radio Data Information Services (ARDIS) network. It also supports circuit-switched cellular networks. Using a feature that sources called CellSmart, it can decide on a case-by-case basis whether circuit-switched or CDPD is the best mode to transfer data.

This array of network support means KeyWare will bring elements of the wired telephone system to the wireless market. Just as a telephone user can make calls without knowing that the country's phone network is made up of disparate long-distance and local networks, KeyWare will help ensure that a CDPD user can send data to an ARDIS user without having to think about it.

No question

Andrew Seybold, editor of the "Outlook" newsletter, wrote that "there will probably never be one single carrier that will be able to provide coverage sufficient to satisfy most companies. This ability, coupled with wired access, makes the Racotek system an important addition to wireless mobile computing."

This means that corporate users trying to decide which network to pick, despite the drawbacks of each, can now simply modify their code to a designated Racotek host server.

"We'd be interested in something like that," said Jeffrey Kreafle, manager of network management at PECO Energy Co. in Philadelphia. PECO, a large utility, has its own private radio network but is looking into a variety of other wireless formats. The need to rewrite applications has helped slow this move, Kreafle said, adding that a product such as KeyWare might encourage PECO to deploy more wireless services faster.

"Assuming that [Racotek's] list of facilities was a) stable, b) usable and c) price-competitive, then that would be very interesting to us," said John Chapman, a senior technology consultant at Amoco Corp. in Chicago.

"We were impressed by" KeyWare, said Virginia Brooks, an analyst at the Aberdeen Group in Boston. "They've got something here, if the product can do what they say it's going to do." Brooks was briefed by Racotek on the product and said it is code-named Crystal.

KeyWare is expected to ship in late March, the sources said, at which time Racotek will announce partnerships with systems integrators such as Electronic Data Systems Corp., Andersen Consulting and SHL Systemhouse, Inc.

Such partnerships would be good news to users, who have consistently complained that they have to do their own integration to deploy wireless networks. That is a daunting task for all but large corporations with mission-critical needs, such as United Parcel Service, Inc., to the degree that most corporations have avoided implementing wireless technology.

"The user has to be to some degree an integrator" to install a wireless wide-area network, said David L. Lyon, president of Pacific Communication Sciences, Inc. in San Diego.

RACOTEK'S KEYWARE CAN SUPPORT MESSAGE PRIORITIZATION AND HANDLE MESSAGES OF UP TO 8K BYTES IN LENGTH. IT FEATURES A RECOVERY PROVISION TO REESTABLISH NETWORK LINKS FOR MOBILE USERS AND ALSO HAS THE FOLLOWING SERVICES:

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Message	Allows users to exchange different data types. Has reliability features such as end-to-end acknowledgment and store-and-forward data delivery.
Time	Allows for synchronized clocks on network devices, which improves scheduling and sequencing for mobile users.
Optimal delivery	Gauges wide-area network availability.
Network management	Provides troubleshooting utilities, performance analysis and routine network management data.

Source: Andrew Seybold's "Outlook on Communications and Computing," Brookdale, Calif.

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ORACLE

Compaq takes market hit despite growth

By Jaikumar Vijayan

In what some industry analysts described as a startling reaction to one of the PC industry's better report cards, Compaq Computer Corp.'s stock took a battering early last week, soon after the company announced record fourth-quarter and 1994 year-end results.

Shares tumbled by as much as 12% last Wednesday after the Houston-based firm announced record earnings of $867 million on revenue of $10.4 billion for 1994.

That response — which some analysts called an overreaction — could have been prompted by inflated Wall Street expectations of Compaq, as well as concerns over first-quarter earnings after Compaq warned of a "relatively flat" period just ahead.

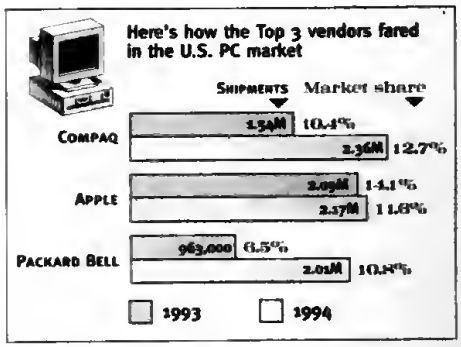
The market's caustic reaction speaks to fears about Compaq's performance in 1995. In fact, it could prove to be a cautionary sign for the desktop giant, analysts said, because Compaq still faces a number of potentially serious problems in the short term, including the following:

- A complete product transition in the first quarter that could result in weak sales as customers wait for new products.
- Continued problems with a rapidly aging portable computer line that has already cost the company its leadership position in the mobile market [CW, Jan. 23].
- A seriously backlogged inventory that was substantially reduced in the last quarter but still exceeds $2 billion.
- A weak Pentium presence that has helped vendors such as Dell Computer Corp. and Gateway 2000, Inc. to the top of the small but growing market segment of corporate Pentium buyers.

Compaq disagrees

Compaq maintains that most of these are temporary problems, if indeed problems at all.

For example, the company's next round of product introductions, slated for later this quarter, will launch a number of Pentium-class desktop PCs and servers based on Intel Corp.'s Pentium and Advanced Micro Devices, Inc.'s next-generation K5 chips. Those products will include notebooks and PCs for the home market.



Source: Dataquest, Inc., San Jose, Calif.

Trickle down

Compaq's forecasts of a tough first quarter sent down the stocks of some other PC makers, too. Among those affected were AST Research, Inc., IBM, Dell Computer Corp. and Gateway 2000, Inc.

Analysts, however, speculated last week that news of Compaq's impending product updates could substantially limit demand as customers hold out for better products and prices.

But Compaq's seeming lethargy in the booming portables market is causing some real concern.

For instance, rivals such as Toshiba America Information Systems, Inc., IBM and a rapidly re-emerging Dell Computer Corp. have begun to announce portables with market-winning features, such as 10.4-in. screens, CD-ROM drives and business audio capabilities. These features are still lacking in Compaq boxes, said Ted Julian, editor of "The Grey Sheet," a newsletter published by International Data Corp. in Framingham, Mass.

Compaq said its current inventory is mostly spare parts and components. Finished goods inventories were pared down significantly in the last quarter, the company said.

One concern analysts have expressed is that excess inventory could lead to a situation similar to the one IBM faced last year when it was stuck with thousands of unsold ValuePoint systems. It eventually auctioned them off.

On the plus side for users is the fact that Compaq's climb to the top of the PC market and its attempts to consolidate its position there could lead to some intense price wars among top-tier vendors, especially in the mushrooming PC server arena, analysts said.

Judge probes deeper into Microsoft antitrust case

Sporkin described as brilliant, energetic by observers

By Mitch Betts and Stuart J. Johnston
WASHINGTON

Microsoft Corp. and the U.S. Department of Justice had hoped for quick and easy court approval of their proposed antitrust settlement. Instead, they got U.S. District Court Judge Stanley Sporkin, who is viewing the case as anything but routine.

Analysis

Conventional wisdom holds that antitrust settlements are usually rubber-stamped. But an inquisitive Sporkin has taken an intense interest in Microsoft's business practices — to the point of suggesting his own set of remedies for charges that appear not in the government's brief but in a book he read over summer recess [CW, Jan. 16].

"I got too involved in this case," Sporkin said at the Jan. 20 public hearing [CW, Jan. 23]. "There are certain things that are gnawing at me."

Several lawyers familiar with Sporkin described him as a "brilliant tiger" and a thoughtful and activist judge who is adamant about making a well-informed decision. That is why he decided to hold the contentious public hearing and to allow anonymous Microsoft rivals to file late comments attacking the proposed settlement.

"He is a very energetic judge who will make up his own mind. He was known as an activist at the Securities and Exchange Commission, and he hasn't become shy and retiring since then," said Stephen Caulkins, a law professor at Wayne State University in Detroit.

A former enforcement director at the SEC and general counsel at the Central Intelligence Agency, Sporkin was appointed to the bench in 1986 by President Ronald Reagan.

Sporkin's approach to the Microsoft antitrust case is colored by his experience at the SEC, where he prosecuted cases charging companies with misleading the public or failing to disclose important information. In the Microsoft case, he appears to be particularly concerned about charges that Microsoft misleads rivals about new products and withholds information about its market-dominating Windows product line from competitors.

After 20 years investigating white-collar crime, Sporkin also likes to find the "smoking gun." So when he came across internal memoranda that purportedly show that Microsoft makes vaporware announcements to freeze the market, Sporkin called them "conspiratorial documents" worthy of more investigation.

Gates groans

However, Microsoft Chairman and Chief Executive Officer Bill Gates last week lashed out at Sporkin for fundamentally misunderstanding the nature of the software industry.

"He might as well accuse Jack and the Beanstalk of doing awful things. He can't understand that when you announce a product in advance, it's only questionable if you do it knowing that it's false. Yes, we announced QB3 [Quick Basic 3.0, a preannouncement Sporkin characterized as a 'smoking gun'] in advance, but ... everything about it was totally true," Gates said.

Judge Stanley Sporkin *takes unconventional approach*

Monopoly?

The Maverick Computer & Communications Industry Association in Washington filed a last-minute brief saying it is concerned the proposed antitrust settlement with Microsoft will still allow the monopolist to offer volume discounts for its operating system. The association also worried that Microsoft will "leverage" its market power in operating systems to dominate the application market.

Gates described the three-phase investigation — explored first by the Federal Trade Commission, then by the Justice Department and now by Sporkin — as "unique in American jurisprudence." He also attacked Gary L. Reback, the lawyer representing three unnamed Microsoft competitors challenging the consent decree and Microsoft's proposed acquisition of Intuit, Inc.

Guessing game

"We have a lawyer in the courtroom that nobody even knows who he represents," Gates said. Asked whom he suspects Reback represents, Gates said, "America Online and Oracle would be my two best guesses. Maybe Borland. Definitely not Novell. I don't think Lotus, but possibly. Who else would it be?"

The Justice Department also objected strenuously to Sporkin's approach. Anne K. Bingaman, head of the department's Antitrust Division, called it "outrageous" to allow eleventh-hour comments by Reback's clients and a separate filing by the Washington-based Computer & Communications Industry Association.

Bingaman further argued that it is improper for the judge to second-guess the department's decision on what charges to file. "I'm the prosecutor. You're the judge," she lectured.

Speculation has now arisen that Sporkin's unconventional approach might cause any decision he makes to be overturned on appeal. Noting Bingaman's charge that Sporkin is second-guessing the Justice Department, one independent lawyer said: "She's right. He's out of bounds."

Microsoft to align Cairo, Windows 95

By Stuart J. Johnston

■ When Microsoft Corp. ships its Cairo update to Windows NT next year, it will also ship an update to Windows 95 that enables the client to tightly integrate with the server operating system, said Chairman and Chief Executive Officer Bill Gates last week.

In fact, once Cairo ships, the company plans to release upgrades to both platforms simultaneously from then on.

"The benefit to customers of having the low-end version [of Windows] and the high-end version [of Windows NT] justifies us going to a lot of hard work to keep those things in sync," Gates said.

"Over time, we've got to get the two release dates lined up, so when we come out with Cairo, we will do a modest release of the desktop version to line up with [it]. And [from] that point forward, we'll do releases at the same time," he said.

Next week's issue of *Computerworld* will feature an exclusive interview with Microsoft Chairman Bill Gates (above) as part of an in-depth special report on the software behemoth and its strategies for tackling the enterprise.

Cairo adds an Object File System (OFS), distributed network support for the Object Linking and Embedding technology and the Windows 95 user interface to the Windows NT 3.5 kernel.

The addition of OFS will enable users to search for information on local machines and across a network based on a wide variety of criteria.

While there will not be any significant changes to the Windows 95 user interface, changes are necessary to give users access to Cairo's advanced features, Gates said.

A good threat

Two industry analysts said Microsoft's evolving client/server strategy is good for customers as well as a threat to the company's operating system competitors, particularly IBM and Novell, Inc.

"By Microsoft having both ends of this, they can have better synergism between the desktop and the server," said Rob Enderle, a senior industry analyst at Dataquest, Inc. in San Jose, Calif. "It really looks like they know what they're doing, and with the lack of a cohesive counter strategy from their competitors — I mean Novell, IBM and Oracle — it's looking more like a Microsoft world."

Microsoft has "been getting a lot of pressure to synchronize the two [systems, and] I think Bill has been hearing that from customers really loud," said Jesse Berst, editorial director of the industry newsletter "Windows Watcher" in Redmond, Wash.

Berst and Enderle see the synchronization of desktop and server system releases as a first step toward their unification into a single operating system code base several years from now.

"They've said for a long time that they want to merge the two code bases," Berst said. "They're currently predicting that the desktop hardware will be capable [enough to allow the merger] in 1997 or 1998. Then you'll have a common desktop and server" system.

Additionally, Microsoft is pushing to make sure it meets its latest schedule for Windows 95, a schedule Gates said the company can meet.

He said users will be able to judge whether or not Windows 95 will be available for sale in August by whether the company begins its so-called preview program on time in March. The preview program will sell prerelease versions of Windows 95 to as many as 400,000 users for about $30, a price intended to cover the cost of manufacturing and shipping the disks to users.

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Mainframe users: Don't touch that plug

Those who counted on the unconditional demise of the mainframe should visit Howard Hunter, manager of Occidental Petroleum's telecommunications and computing facility in Tulsa, Okla.

Three of the company's four divisions have shifted to client/server computing with Unix servers and PC/workstation clients. But the largest division, Occidental Chemical, has shunned client/server in favor of adding new applications to Occidental's two Amdahl mainframes.

"Our chemical plant operations depend on the reliability of big iron," says Hunter, citing a mainframe virtue that got lost in the rush to client/server nirvana. Environmental monitoring, process management, and materials and supplies inventory will remain mainframe-based applications at Occidental for the foreseeable future. And Hunter is being forced to buy another mainframe to replace one or both of his existing 100-MIPS Amdahl 5995s. "We'll need 250 to 260 mainframe MIPS by the end of the year," he said.

Hunter's position is not unusual, according to figures on mainframe sales. Annex Research in Phoenix reports that the total number of mainframe MIPS shipped by IBM and plug-compatible suppliers climbed steadily to a peak of 135,000 MIPS in 1991 and then dropped to 115,000 by the end of 1993. With millions of PCs and servers being installed, it appeared as if mainframe MIPS were heading for a permanent retreat.

The mainframe will clearly be around until the year 2000, and unplugging it prematurely could prove risky.

Charles Babcock

But last year, the decline reversed itself. Mainframe MIPS sales leaped up 39% to 160,000 in 1994 and will reach an estimated 180,000 MIPS in 1995, says Bob Djurdjevic, president of Annex Research.

But isn't this reversal temporary? Won't the continued shipment of powerful PCs and microprocessor-based servers eventually undercut big iron's lease on life?

Not exactly. Contrary to predictions, the mainframe will clearly be around until the year 2000, and unplugging it prematurely could prove risky to the IS director's health.

"By having the [mainframes and client/server systems] side by side, we can see the fledgling nature of the Unix servers," Hunter says. "All those tools that we take for granted on the mainframe [performance monitors, systems management, network management] are not available on Unix."

Several vendors have assembled sets of system utilities for Unix systems, including Fourth Dimension, Tivoli, Computer Associates and OpenVision. But, Hunter complains, those tools that are available come from different vendors and don't "interlock."

In the midst of a seemingly unanimous acceptance for client/server elsewhere, Hunter must heed a schism in his own organization, which requires both mainframe services and downsizing. He believes that the demand for mainframe MIPS will level off in 1996 or 1997, and even the chemical division will start moving toward client/server. But he's not 100% sure.

One reason mainframe MIPS reversed their fall and ticked upward in 1994 is that the price per MIPS dropped radically. What was a $112,000 MIPS in 1990 is now a $39,000 MIPS, Djurdjevic says. If the price decline continues, the chemical division will no longer have a financial incentive to migrate to Unix. It might stick with MVS or invoke the IBM option of running Unix on the mainframe.

But the main reason that mainframes are still around is because of their highly engineered reliability. Unlike a PC or Unix workstation, a mainframe running MVS can take a bullet through the heart and, after a slight stutter, resume processing much as before even if a running application blows up and a connected device sends errant signals. A mainframe's many-redundant, self-monitoring, self-correcting features keep it up and running regardless of individual process errors.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

News Shorts

Mass. state agency demands standard Microsoft API

Officials in Massachusetts last week said they are considering boycotting **Microsoft Corp.** products until the software giant makes them more accessible to blind and other visually impaired users. Charles Crawford, head of the state's Commission for the Blind, said he expects to hold talks with Microsoft executives on Wednesday. At issue is the development of a standardized application programming interface (API) that would enable speech synthesis programs to more easily capture graphical information and then represent it verbally to blind users. After heavy lobbying, "Microsoft has indicated they're willing to develop a standard API," Crawford said. "Then again, the proof is in the pudding, and we haven't had a serving yet." Massachusetts now uses "tens of millions" of dollars worth of Microsoft products, Crawford said. At press time, Microsoft was not available for comment.

IBM announces new desktop CICS

IBM introduced several long-expected CICS transaction processing products, including a faster version of CICS for AIX and client software that enables desktop users to connect directly to any CICS server. IBM also plans fourth-quarter delivery of an agent that will enable its mainframe-based CICSPlex System Manager software to monitor and control distributed CICS for OS/2 servers.

Intel networking software debuts

Intel Corp. last week introduced a broad applications suite designed to integrate client/server LAN management functions, including software distribution and metering, hardware and software inventories, performance monitoring and remote control. The LANDesk Management Suite supports only DOS and Windows platforms, but Intel plans support for other operating systems, including Windows NT, OS/2, Unix, Mac OS and Windows 95.

StorageTek deal hits snag

Storage Technology Corp.'s planned acquisition of Minneapolis-based **Network Systems Corp.** may be in jeopardy following a steep drop in the price of StorageTek stock. The decline, which came after StorageTek reported lower-than-expected fourth-quarter profits, left its stock value well below a minimum threshold set in the purchase agreement. Network Systems shareholders will vote on the deal next week.

Apple takes suit to high court

Apple Computer, Inc. has appealed the rejection of its copyright suit against rivals **Microsoft** and **Hewlett-Packard Co.** to the U.S. Supreme Court. Announced Jan. 20, the petition claims the lower courts erred when they rejected Apple's claim by focusing only on individual elements and not taking into account the overall similarity of Microsoft's Windows and HP's NewWave programs to the Macintosh interface.

SEC nixes electronic stock market

The **Securities and Exchange Commission** rejected a proposal by the **NASDAQ** stock exchange to launch a new electronic trading system. The system, called N-Prove, was supposed to allow traders to barter stocks at better prices than they can now. But SEC officials said the system might make it harder for customers to get guaranteed execution at market prices.

Gupta readies data mover

Along with a major upgrade to its SQLBase database, **Gupta Corp.** plans to unveil next month a data mover tool for collecting information stored in non-Gupta databases, the company confirmed last week. SQL Ranger, which is akin to Trinzic Corp.'s InfoPump, will be priced at less than $500 and will support Open Database Connectivity, Gupta said. The product targets users deploying data warehousing applications.

HP extends middleware help

Acknowledging that users are having trouble moving on-line transaction processor applications from mainframes to Unix servers, **Hewlett-Packard** this week will announce a plan to help customers make that transition. HP is setting up an 800 number that users can dial for middleware information. The vendor's Middleware Engineering Initiative will coordinate a wide array of software and middleware products and services from HP and its business partners.

Volunteer school program begins

The Massachusetts Software Council, along with **Computerworld, Inc.** and **Deloitte & Touche**, has formed the Massachusetts Tech Corps to help schools place computer hardware, software and networking technology in the classroom. The volunteer program will begin with 12 pilot school systems and will spread statewide by January 1996. Technology professionals are being solicited for planning, technical support, networking, resource acquisition and classroom instruction.

Cadre adds SGI debugger to suite

Cadre Technologies, Inc. in Providence, R.I., has extended its object-oriented application development tool kit with debugging and analysis features. The company is using technology obtained from **Silicon Graphics, Inc.** in Mountain View, Calif. Cadre has ported the SGI tool set to Sun Microsystems Computer Corp. workstations and will make it available for Hewlett-Packard Unix workstations as well.

SHORT TAKES **Spectrum Information Technologies, Inc.**, which fell under a wart-exposing spotlight after luring former Apple Computer, Inc. Chairman John Sculley, filed for Chapter 11 bankruptcy protection last week.

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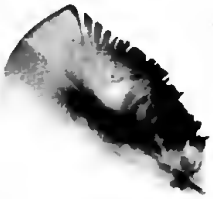

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SGI unwraps Internet authoring system

By Jean S. Bozman
MOUNTAIN VIEW, CALIF.

Silicon Graphics, Inc. (SGI) made its bid to deliver one-stop shopping for Internet document authoring last week. The vendor unveiled an $11,000 packaged Unix system that includes hardware, icon-based multimedia software and World-Wide Web communications links to create Internet home pages for business.

Analysts say they expect other workstation vendors to follow suit by packaging existing Unix workstations and servers with icon-based software. So far, there have been few icon-based authoring packages to speed Internet home page development, they said.

Home pages are created with HyperText Markup Language (HTML), which lets users jump between Web documents by selecting highlighted words.

Other companies have already created software to mask the complexities of writing in HTML. Interleaf, Inc. announced its Cyberleaf icon-based authoring software last fall, and Microsoft Corp. is promising Internet Assistant, an add-on to Microsoft Word that can generate HTML documents for Internet use.

Last week, SGI announced its WebMagic Author icon-based software and packaged its Indy and Indigo2 workstations as Internet development systems. Netscape Communications Corp.'s $39 Netscape Navigator client software and $1,495 Netsite Communications server software will be bundled with SGI's Unix machines, which range from $11,000 to $45,000. Marc Andreessen, co-founder of Netscape, said Netscape 1.1 will support the transmission of three-dimensional graphics this spring. Last week, SGI demonstrated one such 3-D animation written with its Open Inventor software.

SGI's Internet authoring package *is expected to expedite home page development*

Patience is key ingredient

Creating an Internet home page requires patience as well as expertise. Greg McArthur, a software engineer who designs home pages for the National Center for Atmospheric Research in Boulder, Colo., edits HTML documents using the Unix-standard vi text editor on an Indy workstation and loads them onto a server to see the final result. "This moves us forward, leapfrog-fashion," McArthur said. "This software will make it faster for me and for a lot of people."

But using a word processor to create HTML text is not as hard as ensuring that the document can be easily understood — even if read on character-based screens, said Doug Johnson, a senior staff scientist at AER, Inc. in Cambridge, Mass. "You want to tailor your serving capability so that it looks good and works well for a variety of users," Johnson said.

Web nodes double every few months, but many businesses have yet to launch home pages, said Frank Gilhane, a director at CAP, Inc., a Marshfield, Mass., research firm. "Corporate people are holding back not only because of security [concerns], but there are some that need the full SGML [Standard Generalized Markup Language] features to fully describe documents," he said. SGML supports more formatting and tables.

Unix servers dominate the worldwide Internet server market. Sun Microsystems, Inc. sells the Netra packaged Internet server, which includes security firewalls. Sun also has a partnership with Interleaf but has not bundled the Cyberleaf authoring product with Sun systems. "Our business model is to work with key" independent software vendors, Sun's Chief Technology Officer Eric Schmidt said last week.

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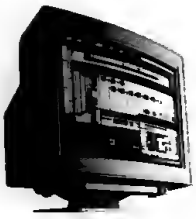

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Hackers try new tacks

Agency sounds warning on 'significant new threat to Internet'

By Gary H. Anthes

An increasingly sophisticated cadre of computer hackers can be met at every turn by equally determined defensive measures. But unfortunately, too few users are employing the defenses.

Last week, hackers used two well-known, but apparently heretofore unused, methods to gain illegal access to computers at Stanford University and the University of California at San Diego.

The two techniques are known as "Internet Protocol spoofing," which enables an intruder to gain access to a system, and "hijacked session attacks," in which an intruder gains control of other sessions active on the system.

Although only two intrusions were reported publicly last week, "there are certainly others going on, and I suspect there are a lot we haven't found yet," said William J. Orvis, a team member at the U.S. Department of Energy's Computer Incident Advisory Capability (CIAC) at Lawrence Livermore National Laboratory in Livermore, Calif.

The attacks triggered alerts over the Internet from the CIAC and the Computer Emergency Response Team at Carnegie Mellon University in Pittsburgh. The alerts described straightforward and reliable preventive measures users can take to thwart the attacks.

However, the CIAC warned, "These attacks represent a significant new threat to Internet systems. Without proactive measures in place, these attacks are very difficult to detect or defend against. [The] CIAC strongly recommends sites implement the solutions described below as soon as possible."

Automated woe

Clifford Neuman, a computer scientist at the Information Sciences Institute at the University of Southern California at Marina Del Rey, said the methods used in the attacks had not been used sooner because they are difficult to execute. But now, he said, someone has written a program that automates the process.

"It is likely that this program is going to be widely available among the community of hackers," Neuman warned.

While computer security experts praised the alerts as offering sound advice, many said they did not go far enough. "We all understand the limitations of using IP addresses for authentication," said Stephen T. Kent, chief scientist for security technology at Bolt Beranek and Newman, Inc. in Cambridge, Mass. "But we haven't yet made the jump to cryptographically-based continuous authentication, which is what the military does and what we should do."

"Similar incidents will continue to occur," said Jim O'Neil, information security manager at Pacific Bell in San Francisco. "This will remain a hot issue until administrators take appropriate action. As [they do], interest in perpetrating this type of attack will wane."

"I don't think hackers are getting the upper hand," said Daniel Geer, vice president for security consulting at OpenVision Technologies, Inc. in Pleasanton, Calif. "But the number of naive networks in the world is going up very fast. This is an area where a little bit of preparation is worth a lot of cure."

Tactical maneuvers

EXPERTS SUGGEST THESE COUNTERMEASURES TO INFILTRATION

Vulnerability: *IP spoofing*

This allows an intruder to essentially impersonate a local system's IP address. Other local systems can be tricked into believing incoming connections from the intruder actually originate from a local "trusted host" and will not require a password.

Defense

Filter packets as they enter your router from the Internet, blocking any packet that claims to have originated inside your local domain.

Vulnerability: *Session hijacking*

Once the intruders have met access on a system, they can use a hacker program to dynamically modify the Unix kernel, allowing them to hijack, or take over, an existing terminal and log-in connections from any user on the system.

Defense

Prevent root compromise through careful system management, installation of security patches and network controls such as firewalls. Sites not requiring SunOS loadable modules should disable this feature.

Source: Computer Incident Advisory Capability, Lawrence Livermore National Laboratory, Livermore, Calif.

Detection rate: 5%

Using the Internet, the Pentagon's Center for Information Systems Security (CISS) tries to penetrate Defense Department systems worldwide. The hackers are able to gain unauthorized access to systems 95% of the time. Only 5% of the break-ins are detected, and of those, less than 5% are reported up the chain of command.

Source: U.S. Army Col. John L. Sheldon, commander of the CISS, Defense Information Systems Agency

Third try could be charm for Newton

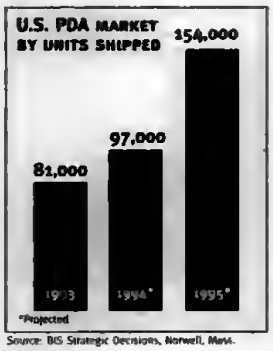
By Mark Halper

CUPERTINO, CALIF.

Sobered by a market that did not share the vendor's early euphoria for personal digital assistants (PDA), Apple Computer, Inc. today will introduce the third iteration of its Newton MessagePad.

The Newton MessagePad 120 provides users with twice as much memory as predecessor MessagePad 110 — 2M bytes vs. 1M byte. But the 2M-byte version will be priced at $699, while the 1M-byte MessagePad 110 costs $599.

The MessagePad 120 has improved screen resolution and enhanced wireless communications capabilities. It also allows for easier swapping of software with desktop computers.



Source: BIS Strategic Decisions, Norwell, Mass.

Whereas Apple once ballyhooed the Newton as a near-revolutionary product, 18 months of soft sales has given the company a more pragmatic marketing face. According to BIS Strategic Decisions, a market research firm in Norwell, Mass., 97,000 PDAs were sold last year, up from 81,000 in 1993.

The new Newton represents an "an evolutionary, not revolutionary" iteration of the product, said Susan Schuman, communications solutions manager at Apple's Personal Interactive Electronics Division.

While Apple has landed a few large corporate sites such as Monsanto Co. in St. Louis, many information systems directors say they have yet to see enough potential usefulness to merit purchasing Newtons or other PDAs in large volume.

Bob Anderson, a senior analyst at A.O. Smith Automotive Products, Inc. in Milwaukee, noted that PDAs serve well when a user has repetitive tasks, such as entering data into forms at supermarkets.

But many salespeople — who are a significant target PDA market — "prefer to go back to their desktop and whip things up in a nice format on a spreadsheet," Anderson said.

The 2M-byte MessagePad 120 should help Apple sell to the corporate market because it will help support large customized software, said Tim Bajarin, an analyst at Creative Strategies International, Inc. in San Jose, Calif. "The No. 1 thing the Newton people were screaming for was enhanced memory. You really need it in the vertical markets."

Platform vendors exit network consortium

By Steve Moore

Hopes that application and platform vendors would cooperate to provide users with sorely needed network management standards dimmed last week as the four platform vendors pulled out of the Management Integration Consortium (MIC).

But despite the departure of Hewlett-Packard Co., IBM, Digital Equipment Corp. and SunSoft, Inc. from the group, the remaining members — more than 150 applications vendors — plan to continue their campaign for user support of MIC standards. That will begin with a common data repository and a common data access application programming interface.

The platform vendors said such standards should be pursued through established standards groups such as X/Open Co., the Network Management Forum (NMF) and the Internet Engineering Task Force.

MIC Chairman Jim Corrigan, who is also president of Ki Networks, Inc. in Columbia, Md., stressed that the MIC's goal is to accelerate standards development in cooperation with other such groups. He noted that the MIC has submitted its repository proposal to X/Open and has adopted the NMF's Open Management Edge specification for application integration.

NETWORK MANAGEMENT

Users applauded the MIC's goals but remained skeptical about the consortium's effectiveness without the support of the leading platform vendors.

"A standard way for management tools to exchange information would make a management operations center a heck of a lot easier to implement," said Mike Prince, MIS director at Burlington Coat Factory Warehouse Corp. in Lebanon, N.H. However, he added, the consortium will have trouble without HP and Sun in particular because users of OpenView and SunNet Manager constitute "an overwhelming preponderance of people using network managers."

"We've all been jaded because we read in the press about these consortiums starting up, and that's the last time we ever hear about them," said Paul Jones, general manager of information services at Unocal Corp. in Anaheim, Calif. Another problem, he said, is that proposed standards too often "take so long to go through committee that by the time they come out, technology has gone past them."

Corrigan said products implementing MIC standards will ship by year's end.

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Lotus hears call of CC:Mail users

By Suruchi Mohan
ORLANDO, FLA

Making CC:Mail administrators' lives a little easier was the goal of several products announced at Lotus Development Corp.'s Lotusphere developers conference here last week.

Chief among them was the DB8 post office, which is expected to ship in mid-1995. DB8 has a file-sharing architecture that will support the shipping version, or Version 2.1, and the yet-to-be-released Version 2.5 on the client. But for users, the biggest advantage of DB8 is its 24-hour, 7-day operation.

This continuous uptime means users can be on-line while administrators tinker with backups and reclaims, explained Vince Shilling, a CC:Mail administrator at Pepsico Foods international in Plano, Texas. And that removes a major hurdle from the task of administering a post office, especially in environments that support many mobile users and span several time zones, he added.

"The only reason to upgrade to DB8 right now is the 24-by-7 operation," said Kevin Amos, a support analyst at Placer Dome Canada Ltd. in Vancouver, British Columbia. Otherwise, "who cares about the database these days as long as you get your mail?"

Full of features

Users also applauded the following DB8 features:

- Allows Messaging Application Programming Interface clients to be used with the post office, which means administrators do not have to mandate which mail package end users should use.
- Lets users move a file from the server to a laptop without using the export/import utility.
- Allows administrators to add fields to the database.

Additionally, Lotus officials talked about building a client that would work on the DB8 post office and with Notes. But "they've never shown that," said Cliff Conneighton, president of The Conneighton Group, Inc. in Hollis, N.H. "All they showed was Notes. I don't think we'll see that product in 1995."

Lotus also announced a slew of other products and business partnerships. Products include the Lotus Fax Server, which will replace CC:Fax, and Lotus Video for Notes Release 1.

The vendor also signed an agreement with AT&T Corp. whereby the two companies will integrate their voice mail and electronic-mail systems. It also sealed a deal with Motorola, Inc. to develop and market the AirMobile wireless technology as an add-on to CC:Mail and Notes.

But user reaction to these announcements seemed lukewarm at best.

"Lotus video and fax are sizzly sorts of things," said Steve Aho, vice president of professional services at MicroAge Computer Centers, a reseller in Kitchener, Canada. "From strictly the bandwidth point of view, people will have trouble in implementation. Video, audio and fax files are huge and chew up a lot of disk space; [they] require a lot of hardware resources."

Amos said that even though his company does not employ a fax server, if he were to consider one, he would go with Lotus and hope for clean connections with other Lotus products. "On the other hand, I would be leery because CC:Fax was a poor product," he added.

Users were confused, too, about whether they should choose Lotus' fax server product, which will not ship until mid-April, or one already on the market. "What do they offer that's new?" asked a user at an electrical appliance company.

Lotus drops

CONTINUED FROM PAGE 1

forms on which they can run the groupware product.

"By offering the runtime [client], it removes a big obstacle to us putting everyone at our site up on Notes," said Mark Bowden, a senior information systems analyst at First Mississippi Corp. in Jackson, Miss.

So far, First Mississippi has run Notes mostly in isolated pockets of its financial departments. Bowden said the high client prices under the past pricing structure prevented his firm from rapidly deploying more Notes clients.

"They should have done this before," echoed Peter Nordman, a data communications specialist at Valmet's Procons Data Corp. in Jyvaskyla, Finland.

The welcome reception for the sought-after runtime client was a far cry from the thumbs-down reaction users gave the Notes Express launch last September. Software developers decried the $99 bundle, and users expressed dismay because the low-end product limited the applications they could run on it.

The runtime price-cutting move was one that Lotus had been extremely reluctant to make. As recently as three weeks ago, Jeff Papows, vice president of Lotus' communications group, said the vendor was just beginning to get the message that users wanted a runtime version of Notes. But another Lotus executive said the company began considering the change "the day after the Notes Express announcement."

Lotus is gambling that by cutting prices and forgoing short-term profits, it can proliferate its product well beyond the 1.3 million seats on the market today.

A company first

In its fourth quarter of 1994, Lotus' communications products pulled in $134 million in revenue compared with $130 million in revenue from desktop applications. That was a first for the company. By comparison, Lotus pulled in $211 million in desktop sales and $68 million in communications products for the same quarter in 1993.

While the lower prices may dampen short-term revenue, Wall Street analysts were buoyed by the move. They noted that selling more clients at a lower price could sell more servers and services, thus broadening Notes' installed base.

"By the time Microsoft ships [Exchange Server], Lotus could have gained the critical mass and so much momentum that Exchange will not be a threat," said Paul Johnson, an analyst at Robertson, Stephens, an investment bank in New York.

Lotus also announced a new client bundling arrangement for Notes Express. Apple Computer, Inc. will bundle it with certain Power Macintoshes and PowerBooks. IBM said it will bundle it with OS/2 Warp.

Analysts said that with Notes' current momentum, augmented by the pricing and bundling arrangements, Lotus Chairman Jim Manzi's estimate of 2.9 million seats by the end of the year may prove conservative.

"They'll probably get another million seats from the Macintosh deal alone," said Matthew Cain, an analyst at Meta Group, Inc., a consulting firm in Stamford, Conn. The Macintosh bundles are expected to ship by the end of the second quarter.

How long Lotus will keep its prices down is anyone's guess. When asked if Lotus would consider raising server prices to compensate for client revenue, Papows would only say that the company is not considering raising server prices now.

"I hope they don't," Bowden said. "But it wouldn't surprise me."

Sphere gazing

Other major product announcements from Lotus last week include the following:

- **NotesView:** A graphical management tool that enables a network administrator to manage up to 150 Notes servers across the enterprise. NotesView for the Enterprise costs $6,000 and requires Hewlett-Packard Co.'s OpenView to operate. A version based on HP/UX will be available by midyear. Lotus sources said versions of NotesView based on IBM's NetView and Sun Microsystems, Inc.'s SunNet Manager will be available by summer.
- **InterNotes:** A new product line aimed at providing Notes sites with access and publishing capabilities for the Internet and the World-Wide Web. In addition to allowing users to publish HyperText Markup Language documents to the Web, it enables them to use controls and administrative tools in Notes to manage end-user access and security. The product costs $7,500 and is expected to ship in the first quarter.
- **Notes HiTest Tools for Visual Basic:** A collection of 12 Windows development tools for the Notes environment. These were designed to give Notes and Visual Basic users the ability to leverage the object store and groupware services in Notes. The tools include custom controls that graphically link objects in an application. The tools also allow Visual Basic-enabled applications such as Microsoft's Excel or Word to access the Notes object store. Available in the first quarter, the tools are priced at $610.
- **Lotus Video for Notes:** A product that lets users capture, record, edit and distribute digital video to and from Notes documents. The product comes with administrative tools to manage bandwidth usage over wide-area networks and determine when to perform replication across the WAN. Lotus recommends users run the client software on 33-MHz Intel Corp. i486 processors.

— William Brandel

Reporter's Notebook

Enthusiasm among Lotusphere attendees ran high. The 6,500 attendees at the Notes 4.0 demonstration gave a standing ovation and yelled they would stay longer for more. One user was overheard saying, "It blew the socks right off my feet."

Lotus execs would not entertain questions about the perennial rumors about Lotus' chance of acquisition. Chairman Jim Manzi did say he would not want people to read into any upcoming lunch dates he might share with Madonna or Michael Jackson.

Lotus broke industry protocol by not leaking the news of its runtime client. As a result, not all users were pleased with the offering, a Lotus exec said. Some customers who recently bought into volume Notes licensing agreements were unhappy to find they could have waited a week and saved tens of thousands of dollars. The executive said Lotus would give unit purchase credits to some of these customers.

In a keynote, one pundit asked the audience to think of its competition five years ago and five years hence. Manzi later said, "Gee, things must be pretty stale at Lotus."

Digital enters remote market with NetRider

By Neal Weinberg

Digital Equipment Corp. will jump into the remote access market next week with a software package designed to help information systems managers tame the menagerie of laptops, PCs and client software being used by telecommuters.

The Digital NetRider 90 and NetRider 900 systems, slated to be unveiled Feb. 6, are aimed at companies with remote offices, mobile sales forces and telecommuters. "This is an important market," said Kimball Brown, an analyst at Dataquest, Inc. in San Jose, Calif.

Brown said there are plenty of niche players on the scene already, but there is an opportunity for Digital if its product stands out and the company leverages its sales force.

The NetRider software was designed to link different types of laptops and PCs, including Apple Computer, Inc.'s Macintosh, into the network through TCP/IP, IPX or AppleTalk. The system is backed by an 8-port or 32-port access server. It includes Internet browser software and unlimited licensing for remote nodes.

Children's Hospital in Boston plans to improve its remote access to an ever-increasing number of clinics and doctors' offices, said Dave Power, a network analyst at Children's. When it does, "doctors will be looking to us for a complete solution," he noted.

The University of New Orleans is grappling with increased demand for remote access from students and faculty, said Daniel Smith, a senior network analyst there. Currently, the school has "taken the chicken way out," he said, by providing support only to DOS/Windows products because that is the largest installed base.

Smith said that eventually the campus will buy a package that addresses both compatibility and Internet access. But he said he has questions in areas such as security, hardware needs, licensing costs and staffing requirements.

Stampede Technologies, Inc. in Dayton, Ohio, provided software for NetRider that lets people in the field gain remote access to their office computers. The NetRider 90, priced at $3,400, will be available next week; the 900 model will be available in March for $9,345.

Senior editor Laura DiDio contributed to this story.

Users shape new CDPD specification

By Michael Fitzgerald

Users should now find the Cellular Digital Packet Data (CDPD) protocol more to their liking thanks to an update to the specification announced last week.

"[This] is the spec we feel we can hang our bats on for years to come," said Chuck Berman, director of market development at McCaw Cellular Communications, Inc.

CDPD, a digital overlay to the analog cellular voice network, lets users send short packets of information without being connected to a phone line. The new CDPD specification will improve interconnections between the various vendors that run the networks, which will lower costs, boost performance and expand functionality.

Users contributed heavily to CDPD System Specification 1.1, Berman added. It will be rolled out in mid- to late 1995.

McCaw is a member of the CDPD Forum, Inc., an industry umbrella group that sets the CDPD specification. Requests from potential large users were given heavy weight, Berman said.

The new protocol was also shaped by the bumbling experience of the current specification's slow rollout.

"Costs need to come down before users will embrace this network," said Gih Hoxie, executive vice president of The Pacific Group, a Santa Clara, Calif., consultancy.

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Alan P. Hald

Keeping pace with Computer Associates

Chairman and CEO Charles B. Wang sounds off on customer relations, ASK and Unicenter

Two weeks ago, Computer Associates International, Inc. did what it has done regularly for nearly 20 years — posted eye-popping quarterly financial results. Revenue for CA's third quarter, ended Dec. 31, rose 26% from the previous year. Profit grew 40%, to $174.2 million.

Computerworld *senior editor Thomas Hoffman caught up with Charles B. Wang, CA's chairman and chief executive officer, last week.*

CW: CA's numbers have been very strong for the past several quarters, yet many people in the industry continue to show amazement at CA's continued success. Why do you think that is?

Wang: Everybody's got these wonderful spreadsheet models — goddamn spreadsheets, I tell ya — and they [industry gurus] don't know how to look at a company that doesn't fit it. I look at software as software.

CW: Until recently, there were analysts who still didn't know what CA's client/server strategy was.

Wang: It's certainly a reflection of our inability to get the right word out. [But] In do $300 million in [client/server] revenue in 12 months, I wish I had more products that weren't so clear to everybody.

CW: Let's talk about the ASK Group, Inc. acquisition. Some ASK users were skeptical of CA's intentions with the products, believing that CA might just plunder the products for their revenue.

Wang: I defy you to look at any of the products we acquired. If anything, we have added more value than any of those companies could have done on their own. Number two, don't forget that this was our first big Unix acquisition. We don't have a base there. Most of these [ASK users] don't know CA.

CW: Yet the retention rate of ASK customers has been high?

Wang: I don't think we've lost any. There was one, the Royal Air Force. They did a letter of intent with ASK and, yes, Informix got that because there was a huge fight internally. I'm not going to get into that.

Charles Wang says *CA added more value to the products it acquired than the previous owners could have own their own*

CW: How would you characterize the reaction to CA's flexible licensing options introduced in 1992?

Wang: We are signing the large [customers] and publicizing those. Maybe we've converted 25% of the base. All I ask [of customers] is a commitment longer term. I'm not asking [users] for more money.

CW: Well, in the three years since you laid the foundation for alternative licensing, has CA made any revisions to the way these licenses are constructed?

Wang: Constantly.

CW: Are they done on a customer-by-customer basis?

Wang: No. And that's why we publish it. We're just now in the process of introducing user-based pricing for our business applications [such as CA-Masterpiece/2000].

CW: Clearly there's been a dramatic shift in customer attitudes toward CA's support, service and pricing in the past few years. Was there a conscious decision about three years ago to start treating your customers differently?

Wang: Absolutely. We didn't have relationships with customers. We sold them products. So we took our sales force, basically cut it in half [and installed] service reps who do nothing more than build relationships. That's probably one of the biggest gambles I've taken at CA.

CW: Many customers felt alienated during CA's legal battles with EDS.

Wang: When we got together with [EDS'] Les Alberthal and Gary Fernandes, it was scary in the sense that we had been so stupid to let lawyers run the show. We became prisoners of bullshit. And we both should have known better because [lawyers] bill by the hour.

CW: Despite the financial success of CA-Unicenter, there have been dramatic changes to the product line in the past year, such as price slashing and the Simple Network Management Protocol support that's been added. Were these changes based on customer feedback?

Wang: Customers did say that they wanted the [Unicenter] prices cheaper, so yes, that was a recognition. And there's so much more to come.

CW: Such as?

Wang: Exciting stuff. We're working very closely with the network management providers, particularly the two major ones, [Hewlett-Packard's] OpenView and [IBM's] NetView. We're also putting Unicenter on top of Ingres.

Harsh words

CA's Charles Wang offered his comments on whether a lawsuit filed by tiny Vermont software developer Reliability Research, Inc. — which CA won two days later — had a leg to stand on. "It's the biggest crock of . . . in the world," he said. "A bunch of sleazebag lawyers, who have no idea what CA was, take one word out of a contract."

See Inside Lines, page 114.

Let's make a deal

CONTINUED FROM PAGE 1

major project before he left his post as chief information officer at American Cyanamid Co. last June, he said.

By consolidating maintenance and support of 10 Oracle databases running on various machines down to three primary site licenses, American Cyanamid in Wayne, N.J., expects to save $500,000 in the next three years, Zeitz said.

Out with the old

In general, users should try to shake vendors out of old thinking. The historic model of 15% to 25% of software license fees for maintenance "is really just an arbitrary, black art kind of arrangement," said Arthur Fakes, an attorney in Lombard, Ill., who specializes in negotiating software contracts.

Percentage-based maintenance often "becomes a revenue-generating mechanism for vendors that does not always correlate to the value received by the customer," according to the Society for Information Management, which recently published a white paper on software licensing.

Indeed, some users are beginning to channel frustration borne of high price tags into negotiating leverage, said Mike Fisher, database manager at Medical Inter-Insurance Exchange. The malpractice insurance firm in Lawrenceville, N.J., was recently able to talk Oracle into a deal to hold maintenance costs steady, even though the exchange added new products to its shop, Fisher said.

One method to save on support that has gained ground in the past 10 to 12 months is the per-call approach, according to Fakes. Instead of shelling out dollars based on a straight percentage of license, users pay a set amount of money each time they call a vendor for support. Often, a monetary ceiling as well as a floor are attached to the agreement.

"I've seen it used with success at some very large U.S. companies, mainly in the Fortune 200," he said.

American Express Co.'s IS group in Phoenix typically demands, and gets, options that other user firms do not, Fakes noted. American Express officials declined to comment on negotiation tactics. Other notoriously tough user firms include Citibank NA and Texas Instruments, Inc., he said.

The per-call technique is also gaining steam as an option fastened to traditional percentage-based deals. The reasoning? New software has a life span. So it may be OK to pay higher fees for maintenance when the software is new and relatively unstable in the first year or 18 months, for instance. But as bugs are worked out and expertise in caring for the software grows, continued high maintenance can be unfair.

"Think about the difference in service that 18% or 20% gets you in Year 1 vs. Year 4," said Howard Rubin, a consultant at CAP/Gemini America, Inc. in Poundridge, N.Y. "You probably don't want to continue paying that much if you're comfortable with the product."

Dangers exist, though. Per-call support can become expensive if users cannot reasonably predict how often they will need help, Rubin pointed out. He likened the situation to buying an extended warranty on a video camera. "You don't know if it's worth the $100 until you understand the typical frequency of repair in your camera's history," he said.

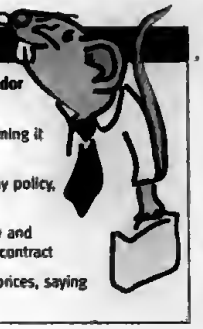
Playing the game

While the knees of industry leaders, such as Computer Associates International, Inc., IBM or Oracle, typically jerk when customers broach such new ideas, the younger, scrappier vendors are more willing to deal, users and consultants said.

Observers cautioned that the merit of — and savings from — these new deals differs case by case. Yet they agree that maintenance is ripe for rethinking.

As Frank Cooper, a consultant at International Computer Negotiations, Inc. in Winter Park, Fla., said, "It's one area where there is definitely fat in the price that can be negotiated out."

Smelling a rat



Watch for and counterpunch these common vendor negotiating ploys:

- Presenting a standard contract early on and claiming it won't deviate from it
- Claiming a user demand is flatly against company policy, though this is not a ruse every time
- Assuring a user that his specific worry is unlikely and therefore does not need to be addressed in the contract
- Pressuring for a quick deal to lock into today's prices, saying fees are about to go up

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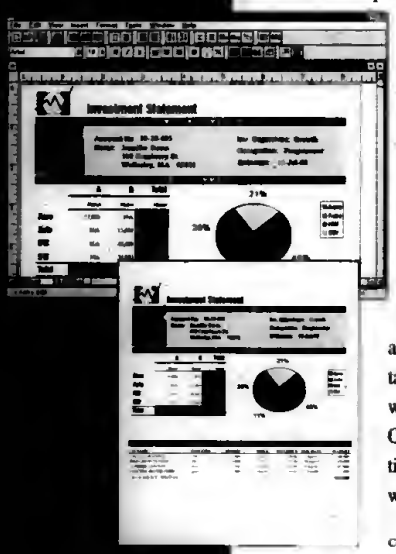

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HP's OpenMail seeks identity

By Suruchi Mohan

Hewlett-Packard Co.'s OpenMail may be the best messaging system on the market, but it is sorely lacking in oame recognition.

And some analysts said they suspect the Palo Alto, Calif., company's inepti-tude in marketing OpenMail may have caused it to miss an important window of opportunity afforded by Microsoft Corp. and Lotus Development Corp., which are both tate with their messaging products. Lotus has yet to move beyond the talkiog stage in delivering a stable client/server messaging product.

"HP has a hig market today for OpenMail as a server," said Tim Sloane, an analyst at Aberdeeo Group in Boston. However, he noted that time is ruooingout for HP as Microsoft's Exchange server and Lotus' client/server model of CC:Mail move closer to the finish tioe.

"OpenMail is HP's best-kept secret," said Bob Jull, president of LinkAge Office Information Solutions, Inc., a value-added reseller in Toronto. Although the product is based oo excellent technology and customers are pleased with its capabilities, it has oot met its sales potential, Jull said. Because the product is essentially a server, the sale is always a protracted affair because it is a system, oot a product, he said. System sales are usually prolonged.

Mixed message

HP does oot see itself as a server provider, however. It is positioning OpenMail as a messaging backbone that is capable of connecting several disparate systems, according to Raul Mujica, a product line manager at the company.

So while the OpenMail group within HP positions the product as a backbone, "the HP sales force is out selling it as a mail product," Sloane said.

> "OpenMail is HP's best kept secret."
> Bob Jull
> LinkAge Office Information Solutions

Hence the confusioo. The company has not beeo able to get a consistent message across in the marketplace.

OpenMail targets Fortune 500 companies that need to connect heterogeneous systems, Mujica said. But HP's servers connect well to form a backbooe in a relatively homogeneous, not heterogeneous, envirooment, Jull said

"Where there are 10 systems that want to connect, it's still SoftSwitch. Where it's just a couple of systems that need a strong server, that's where HP is," Jull added.

Under what terms?

When HP signed an agreement with Lotus in November 1994, it was not clear to users what role HP would play. The message from the two companies was muddled. In fact, for a while the industry widely speculated oo the future of OpenMail and whether it was conceding the messaging market to Lotus.

But what HP was conceding was only the groupware market. Accordiog to the agreement's terms, HP would sell Lotus' Notes on its 9000 Series 800 HP/UX platform. The two companies would still continue to develop their own messaging strategies.

For users employing OpenMail, HP's decisioo oot to eoter the workgroup computing waters raised some interoperability issues. Jack Powell, manager of networks and desktop support at Mobil Exploration and Producing Techoology Ceoter in Dallas, wants to use workgroup applicattions such as calendaring. He said he wonders whether HP's system is truly open.

Whatever happens to HP OpenMail as a ellent/server product — and oot as a backbone — will depend largely on the success of Exchange and the Lotus product. "If Microsoft and Lotus are successful, HP will be limited to customers who want an integrator, oot [a] vendor," predicted Dan Blum, principal at Rapport Communications in Silver Spring, Md.

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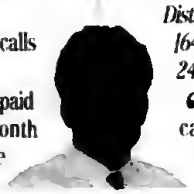

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Business units, IS benefit from sharing ideas

By Thomas Hoffman
NEW YORK

Before Mobil Research & Development Corp. makes any R&D decisions, it gathers information from a critical resource: its customers.

Mobil executives, for instance, listened to what top executives at Caterpillar, Inc. had to say about their plans for designing next-generation diesel engines. Mobil then aligned its own R&D activities to help the Peoria, Ill., construction machinery maker meet its objectives, said James R. Katzer, vice president of planning at Mobil's R&D division in Princeton, N.J.

"It's a vision of what the business people [at Mobil] see coming down the road and then bringing in the technology people to add what they have available," Katzer explained. "If you don't communicate the business strategy all the way down through the organization, you're already in trouble."

This meshing of Mobil's business and technology directives shows how organizations can better leverage their technology investments. This theme was one of the primary topics at "Justifying Technology's Value to the Bottom Line," a two-day conference held here. The gathering was sponsored by The Conference Board and the U.S. Department of Commerce Technology Administration.

At Amoco Corp., the business units and the technology division share accountability for the results of their information technology projects, said Stephen W. Ciaraldi, a planning coordinator at the petroleum giant's exploration and production division in Houston.

Because this practice is relatively new at Amoco, Ciaraldi was not able to provide much detail about early results. However, he and other conference attendees agreed that joint accountability for technology projects is worth exploring — especially if it enables companies to "kill every low-value project [that isn't succeeding] early in its life," said Andrew Brown Jr., director of information, communication, consumer research and administration at General Motors Corp.'s North American R&D center in Warren, Mich.

Hit or miss

Of course, there are times when an organization's business and technology visions are not effectively integrated, and that can result in missed opportunities, some executives said.

"We just found out that we're going to be allowed to enter the cable television industry," said Joel S. Engel, a corporate vice president at Ameritech Corp., a Chicago-based telecommunications firm.

"We should have anticipated this better by building a broadband infrastructure years ago so that 25% of our customers would be available for connection once we're given the green light," Engel added.

In some industries, such as the pharmaceutical sector, companies are being challenged by shrinking production cycles.

The average cost to develop a drug today is about $360 million. And with no guarantees of success, pharmaceutical companies are relying on information technology more than ever, said Ira C. Spector, director of research planning at Wyeth-Ayerst Research in Radnor, Pa., a division of American Home Products in Madison, N.J.

Some of the technologies that Wyeth-Ayerst Research uses to speed product development include computer-based molecular designs and chip-based screen technologies, Spector said.

Wyeth-Ayerst Research has also found that its laboratory technicians communicate their findings to one another more effectively via videoconferencing systems, he added.

"Typically, when we had an important event coming up, we would rely on a mailing to our own database as the prime vehicle for getting the information to the people we had targeted.

This time, with our Enterprise Application Development & Executive Strategy Conference, we knew we had to have a marketing approach that would jump-start awareness for the conference and educate the audience on Hewlett-Packard's Enterprise Application Development Program. We really felt we needed to create our own publication. A piece tailored to deliver information of real value to the customer. That, if they're building a business-critical application, the best platforms for their development are the HP 9000 Workstations and Servers.

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It worked very effectively in creating awareness of the conference and building preference for Hewlett-Packard programs."

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Info-terrorists

CONTINUED FROM PAGE 1

"The technology is real. The capability is real," said Winn Schwartau, executive director of Interpact, a computer security consultancy in Seminole, Fla. "What has gone underrecognized is the ability to use these open source weapons to create a massive attack."

Consultant Paul A. Strassmann, the Pentagon's former director of defense information, said, "If you are a responsible company official, and you conclude that an attacker might use a HERF weapon, then your decision to put a data center with glass windows facing a busy highway may be a foolish act."

Strassmann lectures on information warfare at the National Defense University in Washington.

Corporate preparedness to deal with information warfare is abysmally low, experts agreed. "The bottom line is that the capability of the offense now exceeds that of the defense," Strassmann said. "A very small number of knowledgeable info-bandits can totally overwhelm very entrenched and expensive defenses."

No stranger to the Pentagon

The U.S. is known to have top-secret electronic weapons, and it reportedly used them with devastating effect against Iraqi communications during the Persian Gulf war. Unfortunately, according to experts who have studied the technology, it does not take a rocket scientist or a billion-dollar defense contractor to build a nasty electronic weapon.

These devices are just one source of danger to companies approaching the 21st century, experts agreed. Internet bulletin boards and underground publications such as "2600 — The Hacker Quarterly" are filled with advertisements for weapons. These include $100 libraries of computer viruses, electronic boxes built to trick telephone systems, $29 password "sniffers," spy equipment and free advice for the info-terrorist.

"Info-assassin paraphernalia is booming, and it's gory stuff you can buy," Strassmann noted. "There is also a wide range of people available for hire to carry things out, many of them ex-intelligence agency people."

Schwartau laid out a grim smorgasbord of these devices and their info-crime applications in a recent book titled *Information Warfare — Chaos on the Information Superhighway.*

Users at the conference here were divided in their assessments of the risk from electromagnetic devices. John Pastore, infrastructure manager at Capital One Financial Services Corp. in Fairfax, Va., said security devices in his own data center had been known to disrupt processing by emitting radio frequency interference.

Pastore said he is concerned about any risk having "a small probability of occurrence but an extremely high potential cost." For example, he said if Capital One's credit-card payment processing operation was down for a single day, the company might never recover.

"You have to take [electromagnetic weapons] seriously because the capability exists," Pastore said. He refused to say whether Capital One had taken any preventive measures against the devices.

> "Why pay for information when you can steal it?"
>
> *— Maj. Gen. Alan Pickering, Communications Security Establishment*

For the most part, however, users said they were skeptical of the danger from HERF guns and the like. "I don't see the risk for us," said Phyllis Unger, director of data processing at Rolls-Royce Canada Ltd. in Lachine, Quebec. "As a manufacturer, I'd have to worry more about mundane things such as theft of corporate secrets."

"Yeah, we've thought about it, but I can't say it's the sort of thing that comes up at every board meeting," shrugged Dominic A. Varvaro, supervisor of programming at CAE Electronics, Ltd. in St.-Laurent, Quebec.

Many foreign countries and corporations see cyberspace as an electronic gold mine where it is possible to operate anonymously and with relative ease and high payoffs.

"Do not assume threats are primarily from a ragtag band of hackers," said Michel Kabay, an information security specialist at LGS Group, Inc., a systems consultancy in Montreal. "At the intercorporate level, I foresee that it will be irresistible to those who are unscrupulous to cause damage to competitors through attacks on information systems."

"The end of the Cold War has boosted industrial espionage," added Maj. Gen. Alan Pickering, director general of information security at the Communications Security Establishment, Canada's equivalent of the National Security Agency.

"Why pay for information when you can steal it?" Pickering asked, noting that there are 57 countries known by the FBI to have established formal programs for spying on Silicon Valley companies.

Billions down the drain

Indeed, *The Wall Street Journal* recently reported an accusation by Texas Instruments, Inc. that France's Compagnie des Machines Bull had developed a chip based on secrets stolen by a Bull mole employed at TI. A spokesman for TI said last week that the case had been settled out of court and declined to comment further.

"Corporations are losing billions through electronic theft," said Robert Steele, president of Oakton, Va.-based Open Source Solutions, Inc., a nonprofit foundation that has lobbied the government to strengthen national information security. "IS managers today are like housing developers selling houses with leaking roofs, no windows, no doors and no alarm systems."

Steele said risks to companies include theft of proprietary information, deliberate sabotage of mission-critical systems by investors who have sold short a company's stock and sabotage by disaffected employees. He said the problems are not better known and understood because companies virtually never talk about security breaches, fearing public embarrassment and shareholder lawsuits (see story below).

Strassmann rejected the calls by some at the Montreal conference for the government to share its information warfare defense secrets with U.S. industry. He said chinks in corporate armor result from flawed policies and procedures. "The problem has nothing to do with technology and everything to do with organization," he said. "The defenders are not organized against professional attacks."

Paul A. Strassmann: *'Info-assassin paraphernalia is booming, and it's gory stuff you can buy. There is also a wide range of people available for hire to carry things out, many of them ex-intelligence agency people'*

This weapons excerpt comes from a company brochure on "Electro-Magnetic Pulse Cannons":

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SOURCE: ENHANCED RADIATION WEAPONS TECHNOLOGIES LABORATORIES, A DIVISION OF IAN/SECURE DATA SYSTEMS, INC., GLADWYNE, PA.

The dangers of complacency

Law enforcement and security experts bemoan the lack of public discourse on the threats of information warfare.

And the result is unwarranted user complacency.

"The biggest [information] crimes being perpetrated now are those we don't hear about and won't hear about for years, if ever," said Jan Wolynski, an information security specialist with the Royal Canadian Mounted Police.

Michel Kabay, director of education for the National Computer Security Association in Carlisle, Pa., said he favors the establishment of national data banks of computer security breaches to which corporations and government agencies would be required to report incidents. Names of victims should be kept confidential, he said.

Information warfare specialists are keenly aware that they are seen as Chicken Littles by some in the mainstream user community. "It may be too early to bring company executives into this. If we move too quickly, we will turn them off," said Maj. Gen. Alan Pickering, a Canadian information warfare expert. "I'm constantly challenged — 'Who's been hit? Show me the risk.'"

Yet Pickering and other experts insist that anyone who dismisses threats just because they cannot be documented with extensive case histories is living in a fool's paradise — and sitting on a time bomb to boot.

"If you take the position that danger is based on potential, then clearly you have to say we are just lucky or stupid," said Paul Strassmann, a former CIO and military expert. — *Gary H. Anthes*

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Lotus
Working Together

Israel aims to export high-tech expertise

IS suppliers renew push for overseas presence

By Paul Gillin

Having established diplomatic ties with former enemies, the state of Israel is turning its attention to another daunting challenge: building mind share in the U.S. computer market.

Israeli high-tech executives hope to strike while the iron is hot. The end of the Arab boycott has loosened some countries' long-standing policies against doing business with Israel. The first-ever delegations from Jordan, South Korea and Japan were kicking tires at the Israel Information Processing Association show earlier this month, and "all the major European companies are coming to investigate" Israeli technology, said Hanan Achsaf, managing director at Motorola Israel Ltd. in Tel Aviv.

> Israel faces a dilemma: It has ample intellectual capital to export abroad but little money to do so

Small giants

But the small size of the Israeli market — in which a $150 million company is a comparative giant — has been a hindrance to Israeli ambitions. The country faces a dilemma: It has ample intellectual capital to export abroad but little money to do so.

"It's definitely not a smooth [process], penetrating this market," said David Salton, Boston-based Israeli economic consul to New England. Salton, who advises Israeli companies on how to enter the U.S. market, said these companies are looking to partner in order to build market share rapidly and skirt the high costs of building a sales force.

Sapiens International Corp. entered the U.S. market in 1991 after building a critical mass of cash in Europe, according to Peter Barber, senior vice president at Durham, N.C.-based Sapiens USA, Inc. And even then, "We didn't come here until we had established a fairly strong relationship with a VAR who could support us — in this case, IBM," he said.

Israeli companies are not new to the IS community: Firms such as Scitex America Corp., Sapiens and Fibronics International, Inc. are well established in the U.S., and more than 50 Israeli companies are traded on U.S. stock markets. But there is a renewed push by the $4.6 billion Israeli electronics industry to build an overseas presence.

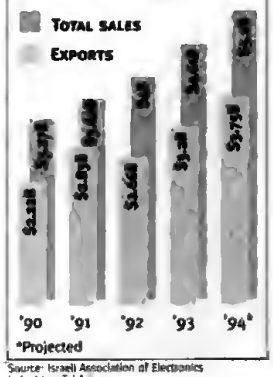
The government is prodding the effort with encouragement and money, although the amounts are modest. Promising research and development projects can get risk-free government funding, and venture capital companies can apply for government loans to fund up to two years' start-up costs for high-tech ventures.

The government-backed Binational Industrial Research and Development Foundation is backing 13 joint U.S./Israeli R&D efforts, including a two-way paging system being jointly developed by American Paging, Inc. in Minneapolis and Nexus Telecommunication Systems Ltd. in Israel. Another project is a bridge/router that will link LANs to Asynchronous Transfer Mode switches, a joint effort of Fore Systems, Inc. in Warrendale, Pa., and Lannet Data Communications Ltd. in Tel Aviv.

The key is to leverage the impressive brainpower but on a budget. Israel ranks first in the world, both in number of engineers and scientists as a percentage of the population and in R&D expenditures per capita. And in the past five years, Israel has benefited from an influx of nearly 400,000 Eastern Europeans, many of whom have ample technical skills.

Looking across the sea

As exports have risen, the output per Israeli electronics employee has tripled to $126,000 since 1983



Source: Israeli Association of Electronics Industries, Tel Aviv

At Digital Equipment Corp.'s Negev Software Industry subsidiary in the Negev, a team of 40 Russian immigrants develops software testing tools for use throughout Digital's worldwide operations. Yigal Bar-Yossef, managing director at Digital Israel, said the company has been flooded with applications from skilled Eastern European computer specialists who will work for modest pay. The government even picks up the first year's salaries for the immigrants.

Orckit Communications Ltd., a Tel Aviv-based R&D foundry, uses technology developed for the defense industry to build core networking protocols for the information superhighway. Late last month, the company delivered a prototype of a technology that supports 8M bit/sec. data transfer over standard copper wiring. The technology could allow local telephone companies to deliver video-on-demand to homes without rewiring.

International briefs

IBM's microkernel goes to Japan

Komatsu Ltd., Japan's largest producer of heavy industrial equipment, has signed an agreement that lets it use and enhance IBM's microkernel technology for factory automation systems. Komatsu plans to integrate real-time control functions into commercial operating systems to run on PowerPC-based systems. This is the third deal IBM has signed for its microkernel technology; the others are with Digital Equipment Corp. and Korean-based hardware maker Goldstar.

Commission emphasizes research

The new 20-member European Commission, the members of which assumed five-year posts last week, backs making information technology research a priority. Edith Cresson, research and development commissioner, told the European Parliament earlier this month that it should use some of the $9.6 billion set aside for research to back high-priority projects in information technology.

SHORT TAKES Siemens/Nixdorf Informationssysteme AG in Germany has agreed to purchase San Jose, Calif.-based enterprise server vendor Pyramid Technology Corp. for $207 million. . . . Hewlett-Packard Co. has officially begun operations in the Philippines, opening an office in Manila earlier this month. At the same time, IBM said it will soon introduce a set of value-added network services, including Internet access, in that country.

Automotive engineering services

Engineering company opens borders with new videoconferencing system

By Mary Brandel

When it comes to international automotive engineering services, Detroit-based Modern Engineering wants to be in the driver's seat.

The company, which is a division of CDI Corp., a billion-dollar temporary service provider in Philadelphia, has traditionally worked with Ford Motor Co., General Motors Corp. and Chrysler Corp.

But that was before Jose Dedeurwaerder became chief executive officer in November 1993. As the former executive vice president of Renault France, Dedeurwaerder came to Modern Engineering with the clear goal of reaching beyond U.S. borders.

Changing methods

"When he started, he told us, 'There are people making a lot more cars than in Detroit,'" said Ed Pallo, executive manager of information support services at Modern Engineering. And "he expressed the clear requirement that he wants to see people when he's talking to them," particularly during negotiations, Pallo said.

That is where videoconferencing came in. The company already uses a room-based system from Compression Labs, Inc. in San Jose, Calif., to conduct meetings among 15 Detroit locations. It just completed an Integrated Services Digital Network hookup with its new office in Paris. "It's not like watching cable TV, but it's amazing how clear it is," Pallo said. Argentina is next.

After that, he said, Modern Engineering will videoconference with "whoever has similar communications and equipment that's compatible." The key component of the Compression Labs system is that it meets domestic as well as international communications standards, Pallo said.

Modern Engineering is not alone in its urge to go international.

Going global

"As the major automotive companies have continued to evolve the idea of 'world cars,' they've felt an increasing need to . . . provide engineering services on a global basis," said John Walthausen, an analyst at C L King & Associates in Albany, N.Y. World cars, he explained, are designed to be sold in any country without modification. Although the trend has existed for "a while, it hasn't been easy to do because of the variety of particular preferences," he said.

"There is a great need for technical engineers to talk to one another," Pallo agreed. However, he added, the system would also be used for statements and business documents "so we're not doing everything through [international mail] or faxing."

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Briefs

Lotus reports loss

Lotus Development Corp. reported a loss of $20 million for its fiscal year 1994, compared with a $55.5 million profit in 1993. The Cambridge, Mass.-based developer also announced a $14.4 million profit for the fourth quarter, ended Dec. 31, a 51% drop from the $29.6 million profit reported for the same period in 1993. Revenue for the quarter declined from $278.3 million in 1993 to $264.5 million. The company attributed the decline to reduced DOS business and competition from Windows suites.

Unisys takes a hit

After taking a $186.2 million pretax charge to cover the elimination of 4,000 positions, **Unisys Corp.** reported a loss of $52.3 million for its fourth quarter, ended Dec. 31. Excluding the special charge, the computer maker earned income of $80.6 million in the quarter. Revenue increased slightly to $2.12 billion, compared with $2.1 billion for the same period last year. Total revenue for the year was $7.4 billion, essentially flat from the $7.42 billion reported last year. Unisys reported net income of $100.5 million for the full year.

Gupta loses $23.9M

Gupta Corp. in Menlo Park, Calif., blamed high sales and marketing costs for the $23.9 million loss reported last week for its fiscal year 1994. In 1993, the company reported $5.6 million in profits. However, revenue rose from $56.1 million in 1993 to $64.5 million in 1994.

SHORT TAKES **Rational Software Corp.** in Santa Clara, Calif., has acquired **Palladio Software Corp.**, an object-oriented tools developer. . . . **Harbinger EDI Services, Inc.** in Atlanta bought **Texas Instruments, Inc.**'s electronic data interchange business unit. All affected TI employees will stay on with Harbinger.

IBM comes out on top in 1994

Amdahl also reports bully fourth-quarter profits while StorageTek, Stratus fall

By Craig Stedman

Forget for a moment about IBM's troubled PC business and you could almost festoon the computer giant with a juggernaut label. Even if you put IBM PC Co. back in the picture, IBM's string of five straight profitable quarters has helped buck up the confidence level of some big customers.

IBM in Armonk, N.Y., came out at the high end of Wall Street forecasts once again in the fourth quarter of 1994, giving it a grand slam for the year. Last week, the company reported a $1.2 billion profit on revenue of $19.9 billion for the quarter, earning the continued praise of users and analysts.

"I don't know if you can say for sure that IBM has turned things around, but they're sure looking a lot better than they were a year ago," said Wayne Pattison, director of data center operations at Kansas City Southern Railway Co. in Missouri.

User confidence rises

George Sekeley, president of the information systems unit at CSX Corp. in Richmond, Va., said he also likes IBM's performance. "I have confidence now that they've found a way to get out of the hole that they got themselves into," he said.

IBM's fourth-quarter profit was three times better than its 1993 figure of $382 million, and revenue grew 7% after adjusting for the sale of its federal division. For all of 1994, revenue increased 6%, to $64.1 billion, and IBM had a net profit of $3 billion. That compares with a 1993 $8.1 billion loss.

Mainframe revenue continued to hold up better than expected, falling less than 10% in 1994, IBM said. The AS/400 midrange line rebounded after several flat years, and the RS/6000 had strong double-digit growth. The PC Co., however, had only a 7% sales increase and was unprofitable.

The PC Co.'s results were described as "disappointing" by Jerome York, IBM's chief financial officer. "This is one-sixth of our business, and it's underperforming materially," he said. An ongoing restructuring at the PC unit will not be completed until midyear, he added.

IBM this year has to show that it can still successfully merchandise PCs, said John Jones, an analyst at Salomon Brothers, Inc.'s San Francisco office. Nonetheless, for the fourth straight quarter, Jones has raised his 1995 profit forecast for IBM as a whole.

Amdahl Corp., one of IBM's mainframe brethren, also reported strong fourth-quarter results due to better-than-expected big iron sales. Amdahl in Sunnyvale, Calif., had a $40.9 million profit on revenue of $496.8 million, compared with a $40.9 million loss and revenue of $442.9 million a year ago.

Not so fortunate was Storage Technology Corp. in Louisville, Colo. StorageTek's fourth-quarter profit of $28.1 million was a big increase over the $6.3 million figure from last year, but it fell well short of expectations due to low sales of its Iceberg 9200 mainframe disk array.

Stratus Computer, Inc. in Marlboro, Mass., also reported disappointing results, with sales of its fault-tolerant systems up just 2%. It also said 1995 revenue would be flat with 1994 levels or down slightly. Stratus and StorageTek were hit with big stock price declines after releasing their numbers.

Information highway

Microsoft readies on-line net strategy

By Ellis Booker

Microsoft Corp.'s impending entry later this year into the on-line network business has already begun to affect the on-line industry.

While The Microsoft Network will not be available until the much-delayed Windows 95 operating system ships in August, "it stands to be a sledgehammer if they get just 5% of all the Windows 95 users on-line," predicted Jayne Levin, editor in chief of the "Internet Letter" in Washington.

Windows 95 is expected to sell 20 million to 30 million copies in its first year.

However, Microsoft is not commenting on the potential traffic, the pricing scheme or the content providers of the network. But sources say it will be launched as an X.25 service, with TCP/IP connections to the Internet expected to added by the end of the year. Sources indicate that Microsoft expects to sign up 2 million users initially, scaling to 20 million well before the end of the decade.

The power of Microsoft

Meanwhile, Microsoft has been busy forging strategic alliances.

Bill Gates, Microsoft's chairman and chief executive officer, announced recently that UUNet Technologies, Inc. in Falls Church, Va., will build a dedicated TCP/IP network through which Microsoft Network subscribers will access the Internet via Integrated Services Digital Network (ISDN) lines. The network will support modem speeds of 14.4K to 28.8K bit/sec.

"In one fell swoop, Microsoft will do more for ISDN than the telephone companies have done in 10 years," said Don Gooding, a partner at Accel Partners in Princeton, N.J.

Microsoft also licensed the code for the Mosaic graphical browser from Spyglass, Inc. in Naperville, Ill. Spyglass is the developer of Enhanced Mosaic, a commercial-grade version of the browser developed at the University of Illinois.

And earlier this month, Microsoft licensed a text-retrieval engine from Fulcrum Technologies, Inc. in Ottawa for enabling members to navigate through content on the service.

There is a general consensus that Microsoft's addition of Internet connectivity via its network will push the Internet over the top and into the mainstream.

But other players are not rolling over and playing dead.

The proprietary on-line networks — led by Prodigy, which announced a browser for the World-Wide Web earlier this month — are rapidly deploying Internet connectivity and browsers.

Danger looms

Even if The Microsoft Network starts with 2 million users, it would be an enormous threat to services such as CompuServe, America Online and Prodigy. These proprietary on-line networks, led by CompuServe, have a combined 4.7 million users today, according to analysis by Forrester Research, Inc. in Cambridge, Mass.

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Give Kahn credit

Borland Chairman Philippe Kahn is getting pounded in the press these days, as well he should. Having made his name synonymous with the company he heads, he has chosen to become the fall guy for Borland's misfortunes. But let's not forget what Kahn and his company have done for the software industry and software users.

The image of Kahn that stands out most in my mind is on a sweltering August day in Washington two years ago, when about 500 excited PC buffs watched him demonstrate the new Quattro Pro for Windows Version 5. He captivated the audience for 45 minutes. At the end, a sweat-drenched Kahn brought down the house by giving away a free shrink-wrapped copy of the spreadsheet to everyone in attendance.

You can call it a marketing stunt, but to the computerphiles in the hotel ballroom that day, Philippe was a hero. They were asking him for his autograph, for heaven's sake.

Borland and its customers have enjoyed a shared respect based on the notion that they followed a different drummer. The company has pioneered some major customer-oriented policies.

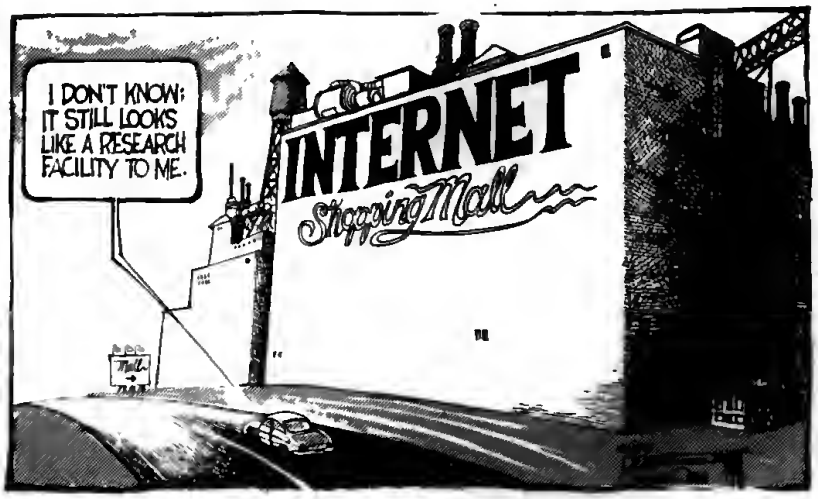
Borland broke into the market in 1984 when the typical business software package cost more than $400 and bore onerous copy protection schemes that basically told the buyer: "We think you're a crook." Its Turbo Pascal and Sidekick were feature-rich software that cost less than $100. And Borland shipped both products without copy protection, choosing instead a simple license agreement that essentially stated that the vendor trusted users to do what was right.

The approach irritated the software establishment, but it wasn't long before competitors followed Borland's lead. Today, copy protection is a dusty relic, and pricing is lower than ever. Licenses are simpler, too.

Even Borland's product flops have portended some important industry trends. It was one of the first major PC software makers to offer volume site licensing. Its ill-fated Turbo Lightning introduced the now-common concept of "as-you-type" spell checking. The defunct Sprint word processor featured a choice of interfaces long before Lotus and WordPerfect adopted the ideas for their Windows products. And ObjectVision was a first stab at visual object programming.

Those accomplishments don't excuse the many mistakes of the past three years, but the problems shouldn't overshadow the contributions the company has made to the industry and its customers. The PC software business is better today because Borland and Philippe Kahn were there.

Paul Gillin, *Editor*
Internet: *pgillin@cw.com*



More sensitivity to women needed

Having just read *Computerworld*'s Forecast issue [CW, Dec. 26/Jan. 2], which looks at "how far we have come in the past 12 months," I found myself frustrated by the scarcity of women featured. Feeling that undue sensitivity on the subject was affecting my judgment, I decided to analyze the incidences of male/female images in this issue.

Of 103 human images, 87 are male (84%), and 16 are female (16%). These numbers break down as follows: 88% to 12% in the main text; 70% to 30% in the advertisements; and 96% to 4% in the graphic illustrations.

The fact that the numbers in the advertisements are slightly more balanced indicates that perhaps your advertisers have a better appreciation of the importance of women in the computer industry than does your editorial staff.

On behalf of the female members of the information technology industry, could I ask that you please address this issue by showing more sensitivity toward a group that is no longer a minority?

Pamela A. Gray
Mill Valley, Calif.

Time to change

Regarding "Big Blue deja vu" [CW, Jan. 16], IBM's frequent reorganizations have always reminded me of a palm tree swaying in a storm. With every reorganizational gust, a few coconuts fall from the top, but nothing affects its firmly planted roots where the employees continue to nourish the rest of the tree.

IBM needs a visionary focus that leads to the development of new and widely accepted software applications, such as workflow, office, image processing, multimedia, personal finance and networking. Additionally, its software approach requires programs that use lots of productive MIPS, work together harmoniously and support IBM's operating environments. More simply stated, it must emulate Microsoft's strategy for the Windows operating system.

Robert Wintermeier
Groton-on-Hudson, N.Y.

Intel misled users with false claim

Mitch Betts laments that there are no "well-vetted algorithms," and he suggests computer buyers start asking vendors harder questions and demanding more rigorous testing and validation of the algorithms embedded in microprocessors and software ["Pentium flaw joins long list of computer math mistakes," CW, Dec. 19, 1994]. No one I have ever known who has depended on numerical calculations has naively believed that the calculations done by their computers are absolutely correct.

However, when a vendor states that its processor is IEEE-compliant, it is saying the errors are absolutely predictable — *not* that there are no errors. Intel said its chip was IEEE-compliant and continued shipping it for several months when it knew this was not the case.

Franklin H. Williams Jr.
Salt Lake City

Oncolink is a valuable resource

I was pleased to see the coverage you gave to the Oncolink matter in "Unplugged Internet board incites debate" [CW, Dec. 19, 1994].

In the article, Daniel Dern was quoted as saying: "At the moment, the Internet is one of the world's largest homes of freely available information, but much of it is also inaccurate and out of date."

As a cancer survivor and a frequent visitor to Oncolink, I have always found Oncolink material to be the most accurate and up-to-date information source available, not to mention comprehensive and convenient. Oncolink is truly an invaluable resource. I hope it remains so.

Bart Kirkpatrick
St. Paul, Minn.

BEST COMPUTER NEWSPAPER 1992, 1993
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Open season on CIOs

Michael B. Cohn

CIOs, beware of footsteps. Hide under your desk. It's open season on information systems executives, and you may be the next to go.

Today's chief information officers are moving up or out at an alarming rate. A handful climb into the boardroom, the rest race riotous mobs of users to the parking deck.

Fact is, every 30 minutes in corporate America a CIO is fired, demoted or made fun of. The job is cruel, brutal and thankless and requires resilience and dedication found only in such pillars as major league baseball negotiators.

CIOs, you need to know where you stand. Are you on the cutting edge of corporate technology or just six figures waiting to be sliced? Should you think about a raise or work on a resume? It's time for a gut check. Just take the following test, run the answers by your CEO, and hope, with fingers crossed, be at least remembers your name.

You may begin

Which of the following describes you?

1. You have read about client/server technology and are trying to understand it.

You understand client/server and are trying to employ it.

You don't understand client/server and are looking for employment.

2. You purchase equipment from multiple vendors.

You purchase equipment from just one vendor and hope it learns your business.

You purchase equipment from just one vendor and pray it stays in business.

3. Your chief financial officer will still let you cool with water.

Your CFO demands you get off water.

Your CFO demands you walk on water.

4. You read 20 hours a week to stay technically credible.

You repeat buzzwords to meetings to appear technically credible.

If you could still do something technical it certainly would be incredible.

5. You're meeting board members' objectives occasionally.

You're meeting board members' objectives regularly.

Your meeting with board members is canceled regularly.

6. The CEO is "rightsizing" and looks forward to your full support.

The CEO is "rightsizing" and looks forward to your full cooperation.

The CEO is "rightsizing" and looks forward to your empty desk.

7. You won't let users develop desktop applications.

You let users develop desktop applications but nothing over 16 bits unless accompanied by a parent.

You let users develop desktop applications as long as they practice safe specs.

8. You already have 4GL systems.

You are finishing a three-year conversion to 4GL systems.

You are still finishing a four-year conversion to 3GL systems.

9. You are not vendor-independent because you run proprietary software.

You are partially vendor-independent because you run open systems.

You are totally vendor-independent because vendors go around you and talk to the CFO.

Your answers could determine if you should think about a raise or work on a resume.

Cohn is author of the humor book *Fear of Computers* and is trying to stay employed at a large company.

The virtual, visible corporation

Esther Dyson

What do many annual reports list as their company's greatest asset? People and partners, not computers or reusable code. In the new world of instant global communications a lot of things will change. Everyone knows about flatter organizations, virtual corporations, telecommuting and the like. But how does the new age play out in the *texture* of corporations as opposed to *structure*?

The short answer is that companies must become more visible. More of what any company sells will comprise information — whether it's plain data, news or analysis, technical support, consulting services, design services, interactive entertainment or competitive intelligence. All of those influence the nature of physical products. Some people will sell products; others in the chain will add value.

Of course, there will be contracts between supplier and customer, but in a knowledge-based world, the quality of those relationships will matter more than the contractual conditions — as in marriage.

Take the case of Microsoft in Europe, where the company sells (as it does in the U.S.) through a network of dealers, value-added resellers and consultancies that don't actually sell software products but guide customers' purchase decisions.

At a recent industry conference in Paris, Microsoft Europe President Bernard Vergnes spoke openly about changes in Microsoft Europe's structure and strategy. He admitted to a few mistakes and described the division's aims for the next year or two. He did all this plainly and straightforwardly, as if talking to an internal sales meeting — the informational, not motivational, part.

Most of the people in the audience were dealers, but not all had a particular relationship with Microsoft. But it didn't matter; by sharing information with them, Vergnes made them *feel* like partners. Even companies that have no contractual relationship with Microsoft are more likely to recommend its products if they feel they understand not just the products but Microsoft itself.

The best cement for a virtual corporation is a two-way flow of information — or visibility. Companies will find partners not just by offering discounts but by sharing information about themselves and sharing their wisdom.

Moreover, whether or not a company chooses to be visible, it will be. As a company, you can't hide. And the image you project, on your Web home page or elsewhere, should be true.

Visibility isn't just outsiders peering in; it's your employees out in the electronic world. They *are* the company. As the value of products diminishes, the outside world's interactions with your people will be what you sell. The quality of the interactions you foster will be what draws employees to your company.

Furthermore, partners will influence and feel involved in decisions their partners make even though companies will not necessarily allow outsiders into the formal decision-making process. By not being transparent but also allowing two-way interaction, such companies will in fact make better decisions.

People want to buy information-based services and products from visible companies that operate as partners. They do not want commodity products from black boxes.

In a knowledge-based world, the quality of those relationships will matter more than the contractual conditions.

Dyson is president of EDventure Holdings, Inc. in New York. She welcomes readers' thoughts and can be reached at edyson@eff.org.

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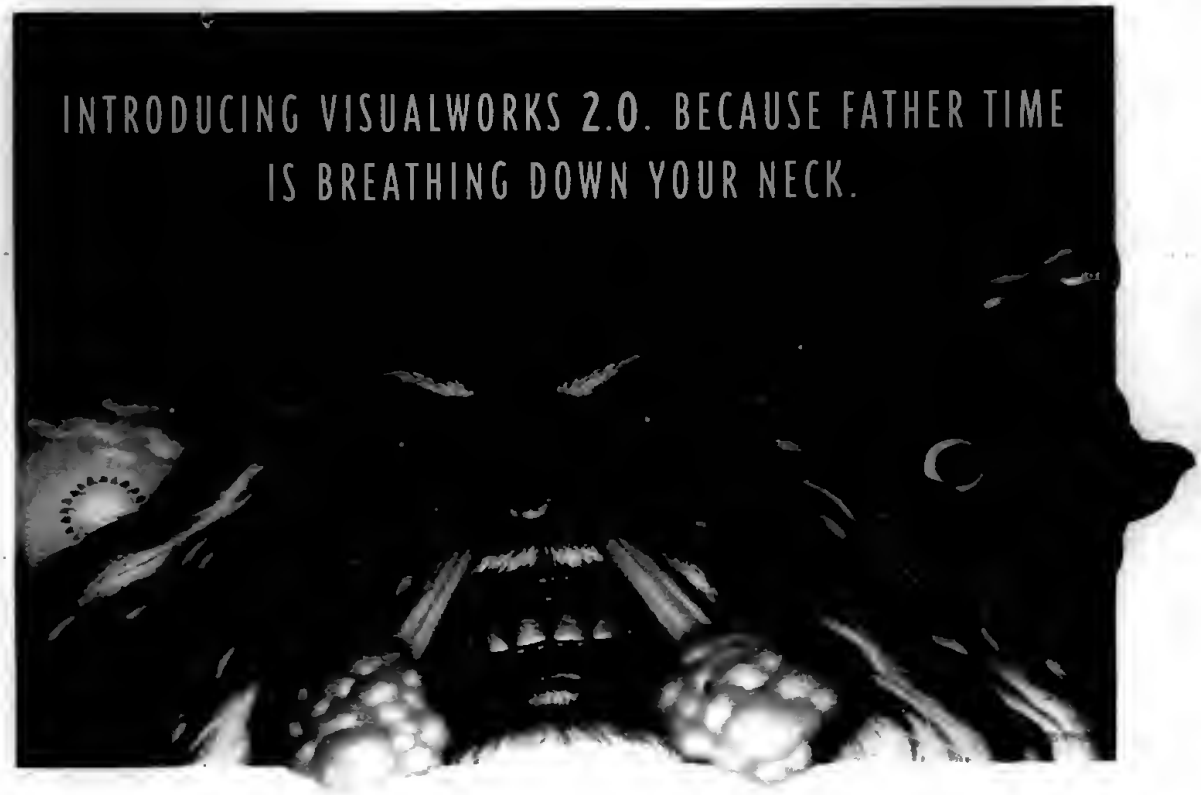

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Mt. Everest climbers take technical route

Notebook computers will track progress

By Michael Fitzgerald

Why surf the Internet from the summit of Mt. Everest? Because you can, of course

Cruising the internet from the ultimate height will not happen immediately, but it is one part of a dream for Steve Reneker, a 13-year information systems veteran who will act as de facto chief information officer on the '95 American Mt. Everest expedition that kicks off March 1.

IS veteran Steve Reneker *hopes to bring technology to the top of Mt. Everest*

Because organizers already planned to bring computer equipment for research purposes, electronic mail from Everest seemed eminently achievable.

Reneker's path to Mt. Everest has been a long one, starting when he took up mountaineering in 1983. In the years since, he has scaled Mt. Whitney, the highest point in the continental U.S., and Mt. McKinley, the highest point in North America ("20,320 feet high," Reneker says without skipping a beat).

Last but not least

The expedition will be led by Paul Pfau, a deputy district attorney for the city of Los Angeles who has climbed the tallest mountain on six of the world's seven continents. On his first crack at climbing the seventh — Everest — Pfau contracted severe pneumonia.

This time, Pfau plans to retrace the path of George Mallory, the first Westerner to attempt Everest. Mallory, who disappeared near the summit in the 1924, followed a route along the mountain's North Ridge, a more challenging route than the one climbers typically follow today.

The 20-member team, which will include one of Mallory's grandsons, will use global positioning equipment from Trimble Navigation Systems, Inc. to plot an exact route. Using a handheld device called a Geo-Explorer attached to a Dell Computer Corp. Latitude XP notebook, the group will plot its position against recent topographical research overlaid

Mt. Everest, *page 44*

He's got high hopes

Steve Reneker

Resume: Joined Security Pacific Bank in 1982; helped start its first PC laboratory and helped manage the installation of human resources systems. Also helped manage human resources systems at Citicorp on the West Coast. Worked in IS for the city of Los Angeles, installing systems for then-Mayor Tom Bradley. Currently director of IS at the Eastern Municipal Water District in San Jacinto, Calif.

Latest achievement: In July 1994, with two partners, climbed California's Mt. Whitney, Mt. Muir and Mt. Russell, all more than 14,000 feet in elevation, in 16 hours, breaking the speed record by more than four hours.

Current goal: To climb Mt. Everest.

Pentium processors

Intel shifts into Overdrive

By Jaikumar Vijayan

Intel Corp.'s efforts to move the market to Pentium slipped into overdrive recently when the company finally announced its long-awaited P24T Pentium upgrade processor. But response to the chip is muted.

As the latest addition to Intel's Overdrive family of upgrade processors, the chip is expected to provide users of 1486-based systems with a bridge to Pentium performance at a price point that Intel hopes will be low enough to evoke interest.

Pentium Overdrive

Processor features

- Superscalar architecture
- 32K Level 1 cache
- 32-bit bus interface
- On-package voltage regulator
- On-package fan/heat sink

The chip will sell for a suggested list price of $449 and speed up 1486 SX2, DX2 and 25-MHz 486-based systems to 63-MHz, Pentium performance — or roughly 2½ times the current speeds of these processors. An 83-MHz version of the chip that will upgrade the 66-MHz DX2 and 33-MHz 486 processor will be available by midyear, Intel said.

At the same time, the Santa Clara, Calif.-based company also rolled back prices on existing DX2 and DX4 Overdrive processors by as much as 45%.

That kind of bait may be necessary to lure customers to upgrade, analysts said. The announcements come at a time when Pentium and 486 processor prices have been falling rapidly, which could dampen interest in upgrading.

"A year from now, users can get twice the performance they are getting today for the same amount of money," said Jennifer Munson, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H., suggesting that as prices continue to fall, users may be tempted to buy new systems instead of recycling older ones.

Where the upgrades are

At the moment, the biggest upgrade market lies in the vast installed base of 486-based systems, said Martin Reynolds, an analyst at Dataquest, Inc. in San Jose, Calif.

"In the last three years, around 70 million or so 486 systems have been sold. Of that, half would probably benefit substantially" from the sort of upgrading that the Overdrive processor offers, Reynolds estimated.

Typically, the systems that would get the most significant performance boost from an

Overdrive, *page 44*

AST steadies notebook offerings

By Michael Fitzgerald

■ After a lackluster 1994, AST Research, Inc. is starting 1995 with an effort that may signal the end of its up-and-down performance in the notebook market.

The Irvine, Calif., company recently introduced the Ascentia 810N, a value-class corporate notebook that should give AST a temporary technology lead in the market. Corporations use value-class notebooks when they do not need or cannot afford a cutting-edge laptop but still want a full-feature notebook.

The 5.9-pound Ascentia 810N has a 10.4-in., passive-matrix color screen, a 66-MHz Cyrix Corp. DX2 486 chip and a second battery option. Its base price is $2,499.

According to figures from International Data Corp. (IDC), AST remained fifth in unit share of the U.S. notebook market in 1994, behind Toshiba America Information Systems, Inc., Compaq Computer Corp., IBM PC Co. and Apple Computer, Inc. But the company has lost market share and faces pressure from competitors such as NEC Technologies, Inc. and Texas Instruments, Inc.

A good start

"AST had an off year in portables last year, and they needed to come out with guns blazing this year. This is a good start," said Bruce Stephen, an analyst at IDC in Framingham, Mass. AST needs to build on this start and attack the competition, he said.

AST officials said they have a window to establish themselves in the value-class market. According to Steven Andler, AST's director of portables marketing, the company has picked a larger screen and a faster (and cheaper than Intel Corp.) chip so it can at least get a short leg up on the competition.

All in a name

Dell Computer Corp., which buys its Latitude notebooks from AST and resells them under the Dell name, is not making life easier for AST. Dell recently cut prices on its Latitude line by 7% to 13%, pairing a 50-MHz DX2 Latitude 450C and a 9½-in., passive-matrix screen at $1,999.

"We're trying to give everybody a new definition of value," Andler said. "Our product is priced below some people's [50-MHz] DX2 systems, and we have a 10.4-in. display where everybody else has a 9½-in. display."

But Stephen and other industry analysts said they expect to see a series of pitched fights in the value end of the corporate notebook market this year.

A number of feature sets now found in high-end notebooks should move into the lower-priced middle range of the market, they said.

Carole Patton

DOS under the covers

Windows has long been trying to live down its dependence on DOS. After all, the need to run atop DOS is what made Windows an environment and not an operating system. (It also made Windows the butt of unrelenting IBM jokes: It's a thing on a thing!) So with Windows 95, Microsoft has finally gotten rid of DOS once and for all, right?

Wrong. In his new book *Unauthorized Windows 95*, Andrew Schulman devotes some 600 pages to demonstrating that DOS is everywhere in Windows 95. For example, thanks to Intel's quirky chip design, all Intel processors need a small piece of real-mode DOS code at start-up to push them into protected mode. No, you won't see it, and no, you don't have to type "WIN" at the DOS prompt. In fact, you won't see a DOS prompt during start-up at all. But DOS is in there.

Essentially, Microsoft has taken some MS-DOS code, modified it to run WIN, HIMEM and IFSHLP and renamed it IO.SYS. (A rose by any other name?) And Schulman shows that DOS hangs around long after boot time. It's there when Windows 95 is up and running in 32-bit mode — with no DOS applications or 16-bit Windows applications running and without anyone installing a single real-mode DOS driver. Here, Windows 95 relies on DOS for many nonfile operations such as getting the date and time and setting the current directory. Schulman covers this in the first 17 pages of his book, including several methods you can use to spot DOS under the covers yourself, so I won't repeat them here.

So what's the concern about a little veteran DOS code? Windows 95 is a transitional system, and everybody knows it. But before you start touting the wonders of 32-bit protected mode, think about this: Windows 95 allocates the lower 1M byte of conventional memory (normally given over to DOS) exactly like earlier versions of Windows do. That's where device drivers (especially multimedia drivers) and virtual drivers (VXD) are installed, and these consume a lot of memory.

Microsoft has never done a good job of fixing Windows memory problems. Consider, for example, the Remote Access Server in Windows for Workgroups 3.11. It cycles its modem every few minutes, each time using up just a little more conventional memory. After about 30 hours, Remote Access Server gyrations have consumed so much low memory that Windows 3.11 can't start up some jobs. Microsoft's work-around: Tell users to periodically exit the server and restart it.

Every Windows program, Dynamic Link Library or driver allocates conventional DOS memory to start up a Windows application, even a 32-bit one.

Low memory is a crucial system resource. Show me a Windows 3.11 system with a sound card and Symantec's PC Tools for Windows 2.0 installed trying to run Symantec's CP Backup or Delrina's WinFax Pro 4.0, and I'll show you an out-of-memory error. The device drivers you see listed in the Windows 3.11 Control Panel are normally loaded into low memory — the DOS address area — and Windows 95 operates exactly the same way.

Counting the advantage

Right now, many corporations claim they won't purchase 16-bit Windows programs after mid-1996. They've decided (rightly) that Windows 95 won't run these 16-bit programs better than Windows 3.11. So long as 16-bit and 32-bit programs share the same conventional memory pool in Windows 95, this situation won't change significantly.

The advantage Windows 95 actually provides 32-bit applications is a separate context — basically page tables for managing memory. Your 32-bit Windows programs do not get their own virtual machine — an exclusive address space. Windows 95 runs them in the same Virtual Machine No. 1 as the 16-bit ones. It doesn't take much speculation to envision a program-loading sequence that will cause out-of-memory errors even when there are plenty of other system resources available.

Just remember that the VXDs in your multimedia device drivers don't use memory above 1M byte except for code, and data buffers and buffers for the hardware also remain in conventional (low) memory.

Patton is chief analyst at Mendham Technology Group in Mendham, N.J., and publisher of "Windows Letter," a newsletter for corporate decision-makers. Her book, *OS/2 Goldmine*, will be available from Van Nostrand Reinhold in March. Contact her at MCI Mail 401-4989 or CompuServe 73700,2503.

Medical company goes distributed

By Ed Scannell

In late 1991, the outlook for medical products distributor The Darby Group Co. was a bit grim.

Severe competition was driving down prices and shrinking profits in an already margin-thin business. The situation prompted Mike Ashkin, chief executive officer at the Westbury, N.Y., company, to launch a major technology renovation. His goal was to help the company deliver products and services faster and more efficiently as well as significantly reduce recurring costs.

One of those recurring costs was the company's aging network of host-based systems.

"It was always a chicken or egg thing in terms of either downsizing employees or downsizing the IS operation," Ashkin said. "We were sort of betting the company on this move."

That bet has paid off handsomely. In less than three years, Ashkin and his team have weaned Darby Group off a mishmash of host-based systems and software. The company now has a single host-based platform that anchors a more standardized distributed platform that is better able to accommodate emerging technologies. One result has been a streamlining of the information systems operation.

ON SITE

The Darby Group Co.
Westbury, N.Y.

Challenge: To downsize mission-critical applications from proprietary host-based systems to distributed LAN-based systems.

Strategy: Build distributed strategy around Microsoft's Windows NT and SQL Server.

Results: Downsized IS department by roughly 30% and dramatically reduced returns processing backlog from a few weeks to a few days.

The PC difference

In late 1991, Darby's IS operating environment consisted of IBM 3090s, 4381s, 9370s and AS/400s running multiple operating systems; Digital Equipment Corp. minicomputers; a distributed network of AT&T Corp. servers, and Paradyne, Inc.'s Data 100 network links connecting the company's dozen or so remote sites. There was not a LAN in the house, and the handful of PCs sat unconnected.

But during the last couple of years, all that has been sliced down to a single IBM 3090 running MVS. The company now has Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare 3.x running on relatively low-cost Intel Corp.-based servers connecting well over 1,000 PCs. The company has cut its IS expenses approximately 35% during the last three years and reduced annual IS labor costs by $250,000.

"PCs have given my company a chance to have a bottom line. If not for those systems, we would not be profitable," Ashkin said.

The quilt work of host-based hardware and software grew over the years partly because of Darby's policy of sticking with an acquired company's IS system. Supporting this variety of complex hardware and software became impractical, however, and in some cases caused the company to lose business.

For example, Darby could not process an order from one of its remote sites if the mainframe in Westbury was down. Remote sites did not have a local database containing a subset of the central database that would allow them to continue conducting business.

So in late 1991, Ashkin and his IS team took a hard look at the operation and decided they needed a standard distributed platform that could better accommodate emerging technologies, such as graphical environments and relational databases — which they believed would better empower users.

"We found it easier to buy new distributed equipment than to force-fit the older stuff we inherited," Ashkin said.

More than a toy

What perhaps propelled Ashkin's aggressive vision of a distributed computing strategy was when his son Carl, now Darby's chief information officer, planted a PC on his father's desk just a few years ago.

"I think he thought it was going to be a toy. But when he found out he could put a report on a laptop and distribute it to others — and not have to wait weeks for IS to help him — he got interested," Carl Ashkin said. "It never hurts you to have the CEO of the company really into the technology."

Through this distributed systems approach, Darby moved its order-entry application from its IBM System 370 architecture machines to LAN-based systems. Within 18 months of making that decision, the firm had replaced almost all of its terminals with PCs and built a wide-area network that connected all remote offices to the mainframe at headquarters.

This client/server approach has also allowed Darby to improve the efficiencies of the "returns" aspect of its generic drug business. Returns in the pharmaceuticals market are more complicated than in other businesses because of strict government regulations.

Before the company proceeded with its distributed strategy, it was typically a few weeks behind in processing returns. But since the company rolled its IBM 4381 out the door and rolled in a server system running Windows NT and SQL Server, those backlogs have been cut down to a day or two.

While Darby has aggressively moved forward with its distributed strategy, including putting LAN administrators in some of its remote sites, company officials do not see true decentralization of IS operations coming any time soon. In fact, they prefer to keep a tight grip on certain core IS functions, including application software development.

"We used to have 100 people in IS, and now we have 70," said Neal Perlman, Darby's IS director. "We could accept a 30% reduction by eliminating anything that was redundant in the home office with remote sites. It is why you need to keep certain things centralized, even as you distribute other functions out."

Not only was Ted amazed at the low cost of the Digital terminals, he was even more impressed with their performance.

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LAN servers

Acer releases new server products, bundled software

By Jaikumar Vijayan

Acer America Corp., rated as one of the fastest-growing companies in the PC business, last week announced two server products and bundled network and server management software in the hopes of getting more recognition in the LAN server market.

The entry-level Acer Altos 800/P, based on Intel Corp.'s 90-MHz Pentium processor, was primarily designed as a file-and-print server that supports up to 32 users, according to the San Jose, Calif., company. The starting price for a base system is $3,118.

The midrange, dual-processor Acer-Altos 7000/P, which is being positioned as a database/application server, supports two 90-MHz Pentium processors, up to 64 users and has a starting price of $5,187.

"Price/performance was a big factor in our decision to choose Acer," said Ken Bryant, information systems manager at General Health Practice Management, Inc. in Baton Rouge, La.

The organization has tested the remote capabilities of Acer's new Server Manager software across 21 remote Acer sites, "and as far as the quality of Acer products are concerned, there are no complaints so far," Bryant said.

Bundled up

Acer said it will bundle its server and network management software with its server products. The new monitoring software, which has a graphical user interface, among other things, provides network administrators with fault detection and automated early warning signals in the event of a system or network problem, Acer said.

Acer, which last year became a Top 10 vendor in the desktop business, grew more than 85% in 1994, according to International Data Corp. in Framingham, Mass.

Overdrive

CONTINUED FROM PAGE 41

upgrade processor would be the more recent 486-based systems with features such as a local bus, larger disk drives, Peripheral Component Interconnect slots and recent BIOS versions, analysts said.

Even in such cases, greater overall system performance can be achieved only through a processor and motherboard upgrade, said John Williams, MIS manager at Priority Pharmacy in San Diego. Processor upgrades alone seldom boost system performance substantially, he said.

Logical decision

With new systems not quite lasting a year before requiring upgrades, "it's always made more sense for us to replace the whole motherboard" when doing a systems upgrade instead of tinkering with jumper settings and switches on old motherboards, Williams said.

Williams, who said he has run into compatibility problems when attempting just a processor upgrade, said buying a new motherboard not only eliminates most system incompatibilities but is also pretty economical these days. "You can go out and get a real nice motherboard for less than $200," he said.

Despite the low prices, when it comes to older 286- and 386-based systems, Priority buys new systems instead of upgrading, Williams said.

Falling prices

Intel last week rolled back prices by up to 45% on some Overdrive processors. A 100-MHz DX4 Overdrive processor that used to cost $649 now sells for $349. Similarly, a 75-MHz version, which cost $549, now goes for $299.

Upgrade priorities

Another manager echoed that sentiment. "Right now, we have the option of upgrading our 486 systems, but all of four old 386 systems are going to be replaced," said Ken Bryant, information systems manager at General Health Practice Management, Inc. in Baton Rouge, La.

"Ease of installation and price are right on top of the list" when considering processor upgrades, Bryant said.

Intel's new Overdrive processors, which started shipping last week, will upgrade most 486-based systems with either a 237- or 238-pin socket, the company said. According to Intel, the user can replace the chip.

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Mt. Everest

CONTINUED FROM PAGE 41

on a scanned orthographic photo.

The team also hopes to use the global positioning equipment to help verify Everest's elevation.

The group will use a second notebook to track equipment, keep medical records and do word processing.

But it is unlikely everest.net will happen on this trip. "We're missing a high-speed link," Reneker said.

Vendors have donated most of the group's equipment, On Technology Corp. is sponsoring its base camp and NEC Corp. has provided a satellite link and 300 minutes of free satellite time. The speed of the link, however, is 2.4K bit/sec., which is too slow for effective Internet communications. But the link can support fax communications at 9.6K bit/sec., so the team will send some faxes from its highest base camp.

Avid Technology, Inc. has announced MediaSuite Pro, a video editing system for Silicon Graphics, Inc.'s Indigo workstations.

According to the Tewksbury, Mass., firm, MediaSuite Pro lets users incorporate graphics such as real-time simulations, three-dimensional animations and structural models with video and audio.

Programs created with the product can be recorded, edited and played at full size and full motion and recorded directly from the computer to videotape. Programmable video effects include dissolves, wipes, motion control, chroma key, transitions and picture-in-picture.

MediaSuite Pro costs $14,995.

▶ *Avid Technology*
(508) 640-6789

Summagraphics Corp. has introduced SummaColor Pro Series Models 1311 and 1317, desktop color printers.

According to the Austin, Texas, firm, the SummaColor Pro Series Models 1311 and 1317 are small-format digital printers that incorporate ink-dot-size control and thermal transfer technologies.

The printers are targeted at graphic artists and feature an optional Ethernet adapter, font support for 39 Type 1 Adobe Systems, Inc. fonts, a SCSI hard drive interface and 12M bytes of standard memory, upgradable to 136M bytes.

The letter/legal-size Model 1311 costs $6,495, and the tabloid-size Model 1317 costs $8,995.

▶ *Summagraphics*
(512) 835-0900

Product short

MetaWare, Inc. has announced the High C/C++ compiler with a software workaround for the Intel Corp. Pentium floating-point division error, and **Cygnus Support** has announced a similar patch for the GNU compiler-GCC. Both are free to users of the respective products. MetaWare, Santa Cruz, Calif. (408) 429-6382. Cygnus Support, Somerville, Mass. (617) 629-3000.

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Texas Commerce reinvents itself

Workflow is critical to bank's new 401K system

By Mary Brandel

Texas Commerce Bank NA had a busy 1994. At the beginning of the year, all 9,000 employees at the Houston-based subsidiary of Chemical Banking Corp. embarked on a top-to-bottom re-engineering project, uncovering 15,000 recommendations for process changes.

In the midst of that project, the bank rolled out a new 401K business after acquiring Ameritrust, a trust company.

"We just got the salespeople" from Ameritrust, said Anita Ward, senior vice president at the bank. "So we needed a product, operations and a system in the very near term so that we didn't lose market share to companies with an existing infrastructure."

"We looked at all our processes. Even if we were filling out a form in triplicate, we'd question why."
— Gloria Rust, vice president of management consulting

In the spirit of re-engineering, Texas Commerce did not just create a mirror image of the Ameritrust business. "If we hadn't re-engineered the process, we would have created the same 401K product as others have," Ward said.

Instead, it created a 401K plan called Avesta. It has attracted 26,000 participants, with another 40,000 in the enrollment process.

After just six months, Avesta revenue is 1½ years ahead of schedule, and operating expenses are down 80% from Ameritrust's business, Ward said. And whereas Ameritrust's 401K staff numbered 100, Texas Commerce employs just 16.

At the core of the 401K system — as well as many of the 1,005 projects scheduled to be completed this year — is workflow technology.

Workflow is important to 401K plans because it can "bring together the investment plan with the individual's account," said Mark Hardie, a technology analyst at Tower Group, a bank technology consulting firm in Cambridge, Mass. Those systems tend to be separate, he said.

Hardie said the goal of integrating those systems is threefold: better management of increasingly diversified investment funds, close tracking of the impact on the employee's account and higher quality interaction between the bank employee and the customer.

Problems with paper

As Ward described it, many 401K systems are manual and error-prone. Participants fill out at least six long forms and give them to their human resources department, where they are compared against personnel records.

Those paper copies are sent to the bank, where the data is entered into its system. For six weeks, however, the form is not processed because participants are allowed to make changes. Making changes involves another piece of paper, which means "you're in a data entry frenzy for six weeks," Ward said.

At the end of the enrollment period — and at every payroll cycle — the client company sorts out 401K participants from the payroll, and the bank matches those records with its own.

"You're always reconciling paper to the payroll tape," Ward said. "And you end up with errors because maybe I just recently enrolled, but the payroll cycle ended two days ago."

Texas Commerce's new system precludes these problems. The client provides the bank with an electronic payroll record for all employees. "All the data we'd need to set up a participant is resident on that record," Ward said.

To enroll, participants fill out an electronic form on a PC at the client site. The PC runs ViewStar Corp.'s workflow software as well as some Windows appli-

Texas Commerce, *page 49*

Notes packages unite voice mail with E-mail

By Sumeehi Mohan

LAN-based electronic mail was once considered quite a novelty. But as E-mail becomes more entrenched in organizations, users seem to be taking it for granted and looking for more functionality on their desktop. Or maybe vendors think users should want more than just E-mail in a package.

Acting on the premise that users need their faxes, voice mail and E-mail to arrive in the same mailbox, vendors are combining these diverse technologies.

At the Lotusphere conference in Orlando, Fla., last week, Big Sky Technologies in San Diego announced its Remark MessageCenter for Notes, a product that essentially integrates voice mail with E-mail.

An old idea takes flight

The concept of MessageCenter is not new to Big Sky. In the summer of 1993, the company, then known as Simpact Associates, introduced its PhoneClient development tools that third-party developers could use to write applications using Lotus Development Corp.'s Notes development platform. MessageCenter was written using PhoneClient. The latter sits on Phone Notes, which in turn runs on an OS/2-based server.

The company has essentially taken the development work out of developers' hands and left them with only the need to customize, said Dusty Sykes, a consultant at Vanguard Communications in Palo Alto, Calif. "Their developers were having to do so much; they refined [the product] and gave a bigger chunk of functionality with MessageCenter. Now, the end user is paying for customization, not for the development of the entire messaging capability."

Latitude Communications' MeetingPlace *integrates audioconferencing with E-mail*

MessageCenter converts the Notes Mail database into a unified mailbox that is capable of handling fax, voice mail and E-mail messages. Its auto attendant feature lets calls be routed and allows paging. Users can dial in to the MessageCenter to read their E-mail and listen to their voice mail messages. Alternately, they can use the phone to dial into the database and have their E-mail read to them using text-to-speech conversion.

Although the company touts the product as a possible replacement for voice mail, large users said they will not do that any time soon because they do not think the product will be able to handle large volumes of calls. "We're happy to buy advanced telecommunications from a vendor," said a user at a New York-based insurance broker who asked not to be named. "We don't want to become our own voice-mail administrator." She did say it would be useful to be able to share directories: "This is more important than listening to E-mail."

Audioconferencing made easy

Additionally, as audioconferencing takes off, vendors are trying to integrate these systems with E-mail. Earlier this month, Latitude Communications, Inc. in Santa Clara, Calif., announced MeetingPlace E-mail Gateway, which essentially integrates audioconferencing with E-mail.

MeetingPlace is an audioconferencing server that lets users set up conferences without help from operators at telecommunications companies. Users schedule meetings, distribute materials or notify attendants with the E-mail transport. The audioconferencing server connects to a company's private branch exchange system, which goes into the public switched-telephone network. The E-mail gateway sits on the LAN and talks to the conferencing server via TCP/IP.

On the Lotus front, the company supports Vendor-Independent Messaging on the gateway, so CC:Mail and Notes users can directly access the network.

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Sync Research offers SNMP-based apps

By Laura DiDio

■ Sync Research, Inc. in Irvine, Calif., recently introduced new Unix and Simple Network Management Protocol (SNMP)-based applications for its FrameNode remote-access products and its ConversionNode protocol converter devices.

The FrameNode remote-access devices transmit merged IBM SNA and LAN traffic and provide users with RFC1490-compatible access to wide-area networks over frame relay. The ConversionNode products act as protocol converters, merging LAN and SNA traffic on the same network.

The network management applications, dubbed Sync/Manager and Sync/Monitor, run on Unix and SNMP platforms. They let network administrators manage and monitor mixed SNA and LAN traffic while retaining the familiar look and feel of IBM's NetView SNA network management, said Sync President John Rademaker.

Sync/Manager and Sync/Monitor for SNMP work in conjunction with various network management platforms to provide customers with an integrated, SNMP-based network management system for FrameNode and ConversionNode networks.

Sync/Manager for SNMP provides businesses with configuration, monitoring and individual log-on capabilities for Sync Research devices using Hewlett-Packard Co.'s HP OpenView for Windows and HP OpenView for Unix. The Sync/Monitor package gives network administrators a graphical picture of the network and delivers a "world view" of the enterprise using Unix management platforms, such as NetView for AIX, HP OpenView for Unix and Sun Microsystems, Inc.'s SunNet Manager, Rademaker said.

Both Sync/Manager and Sync/Monitor for SNMP are available now and are priced at $2,995 each. Sync/Manager for HP OpenView for Windows is shipping now and costs $995.

[redacted]

Locus Computing Corp. has announced Locus/FTP Internet host file transfer, TinyTerm Unix terminal emulation and the Eudora local, enterprise and Internet electronic-mail interface.

According to the Inglewood, Calif., company, the products are options to Locus' PC Interface 5.0 PC-to-Unix connectivity software. Locus/FTP connects any TCP/IP host on the network or internet and lets users drag and drop files from the remote host to the local drive or between remote hosts.

The Eudora E-mail interface is a graphical Windows interface to Unix E-mail servers.

Locus/FTP costs $79, TinyTerm costs $89, and the Eudora E-mail interface costs $59.

▶ *Locus Computing*
(310) 670-6500

Belkin Components has announced OmniView, a keyboard-controlled switch that lets users control up to six PCs from a single keyboard.

According to the Compton, Calif., company, OmniView sends correct signals to the keyboard and mouse port so each PC acts as if it were directly connected. Users can select which PC to control.

The product requires no software installation and can be cascaded to control up to 216 PCs. A scan mode shows the status of each PC at selected intervals, the company said.

OmniView costs $349.

▶ *Belkin Components*
(310) 898-1100

Northpoint Software has announced CompassPoint, a visual database for Windows.

According to the Berkley, Mich., company, CompassPoint holds up to 100,000 scanned images including photos, slides, illustrations and computer-produced image files.

Stored with each image are up to 15 searchable fields, a keyword field and two description fields. The product uses data compression to store and send thumbnail images for browsing over a network to limit network clogging.

CompassPoint costs $995.

▶ *Northpoint Software*
(810) 543-1770

Product short

Walter Oney Software has introduced Boarding House Reach, groupware that lets users copy a Windows clipboard from any computer in a workgroup with one mouse click. Cost: $49. Walter Oney Software, Boston, (617) 227-5620.

Texas Commerce reinvents self

CONTINUED FROM PAGE 47

cations that provide advice and what-if modeling to help with investment decisions.

From the workstation, field data is transmitted directly to a work queue at Texas Commerce. The workflow system automatically matches up that information with the payroll record and then sends the form to be processed in a 401K accounting system. Unless the form is rejected, no human interaction takes place.

The bank also offers mail-in, fax-in and call-in enrollment via a voice-response unit. However, the fax option does require manual data entry "because there is no way to [read] optical character recognition data 100% accurately," said Glenn Rust, vice president of management consulting. But mail-in forms are bar-coded with the client's payroll information in advance, and when the form is scanned in, workflow is initiated.

Consolidation advantage

Key to the system, Hardie said, "is having a single point of input, and that individual doesn't have to be a senior person in human resources. HR responsibilities [are starting to move] into the lap of the bank."

Plus, "you don't have this chasm across which you toss a bunch of forms," he added.

But the technology did not come first at Texas Commerce; business did. "We had the teams design new workflows ... without knowledge of the technology," Ward said. "But oftentimes, it became apparent that the technology and workflow could assist the process."

Volatile industry

Observers may wonder why all this re-engineering had to happen at once. But, Ward explained, "the entire field of banking is undergoing tremendous change. Mutual fund companies can sneak up on us, as can others in the credit-card market. And at the same time, people are moving toward home banking."

To reinvent itself, "we had to take the entire bank through this exercise," Ward said.

SGI proves smaller units can be better

Downsized Reality machines give users high-end graphics desktops

By Jean S. Bozman
MOUNTAIN VIEW, CALIF.

Silicon Graphics, Inc. (SGI) recently downsized its high-end graphics Onyx Reality machine — the kind of computer that generated images for the movie *Jurassic Park* and designed submarines for the U.S. Navy.

Redesigned as a one-processor personal workstation for engineers and designers, the smaller unit is expected to reduce waiting lists that control access to bigger Onyx Reality machines at busy engineering sites.

The Reality Station costs $94,000, far less than the $170,000 entry price for the large-scale Reality machines, SGI said earlier this month.

Users at sites that already own large Onyx Reality graphics computers said the low-end version will probably shorten sign-up sheets for the bigger machines at large engineering shops. "When you buy an Onyx, you put it in a lab, and everybody can share it," explained Michael Zeitlin, a visualization technology manager at Texaco, Inc.'s Houston office. At Texaco, dozens of users share several large SGI machines to run seismic analysis and oil-reservoir simulation applications, he said.

A Reality Station would let some users have a high-end graphics desktop, freeing the bigger machines to run larger problems, Zeitlin said. Today, Texaco uses SGI's Indigo2 workstations — which cost up to $40,000 — to develop graphics applications that are later deployed on the large Onyx machines.

SGI's Reality Station

Processor: 200-MHz Mips Technologies, Inc. R4400 chip
Features: One R4400 CPU, 1M byte of secondary cache, 64M bytes of memory, a 2G-byte system disk and a 21-in. high-resolution color monitor
Available: March, with shipment of an audio/sound option slated for April
Base price: $94,900

Putting the parts together

At General Dynamics Corp.'s Electric Boat Division in Groton, Conn., employees use a half-dozen large Onyx machines to design submarines for the Navy. But smaller units could take on sections of a larger design. "The way you get the big models is by putting together little models," said Jim Boudreaux, engineering manager for computer systems technology at the facility. "It would be nice if you could work on the little pieces without working on the big machine." Boudreaux said he had not yet evaluated the Reality Station.

According to analysts, SGI is making an aggressive move to maintain its price/performance edge over rival workstation makers IBM, Hewlett-Packard Co. and Sun Microsystems, Inc. "What SGI is doing is using their leadership in graphics to move into the high-volume graphics market," said Dominic Ricchetti, manager of workstation research at Dataquest, Inc. in San Jose, Calif. Even so, he estimated that 15% or fewer of all workstation sales are for high-end three-dimensional graphics.

Howard Richmond, vice president of high-performance computing at Gartner Group, Inc. in Stamford, Conn., said SGI wants to boost demand for its wares. "The demand just expands as the price comes down," he said.

Traditional markets for engineering and entertainment visuals will draw users, but so will the trend toward data warehousing, which may accelerate interest in colorful graphics to spot trends in volumes of data, according to Richmond. "As companies get more and more data that they have to analyze, they want to visualize it, to take a look at it," he said.

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What's new on the wide, wide Web

A semiregular column with items of interest and amusement from the Internet.

'Net news

▪ The Web is widening. According to Forrester Research, Inc. in Cambridge, Mass., by 1998 the Internet will eclipse the likes of Prodigy and America Online. Forrester projects that the number of proprietary on-line service users will grow from 4.7 million today to 10 million in 1997. After that, the number will decline as consumers opt for the Internet. By the year 2000, Forrester said, there will be 6.7 million users of proprietary services vs. 22 million users of the World-Wide Web.

▪ Spry, Inc. in Seattle has released Mosaic in a Box, a one-disk software package that includes a Mosaic browser for the Web and an automated network sign-up through the more than 400 worldwide nodes of the CompuServe network. Spry said it will offer customized versions of the package for corporations that want to distribute Mosaic In a Box to their customers. The suggested retail price for the software is $49.95; connection rates include a $9.95 monthly fee and $3.95 per hour after the first five hours.

• Reacting to price breaks like this for Internet users, CompuServe said it will cut its 14.4K bit/sec. access rate from $9.60 per hour to $4.80 per hour (plus the $9.95 per-month fee for an ensemble of basic services) on Feb. 2.

▪ But CompuServe — not to mention rivals Prodigy and America Online — is feeling pressured by the impending arrival of The Microsoft Network in August. Pricing for the Microsoft Corp. offering, which will be available to Windows 95 users, has not been disclosed, but observers are convinced it will seriously undercut the rates of existing public data networks.

• Speaking of Internet strategies, Prodigy became, as expected, the first provider with a Web browser. The feature was launched Jan. 17. CompuServe and America Online are expected to follow suit.

▪ And IBM, which already claims 35,000 dial-up Internet users via its OS/2 Warp, last week at ComNet launched a business service for dedicated Internet links ranging in speed from 56K bit/sec. to T1. Advantis, IBM's networking arm, will handle the dedicated lines and firewall services. Pricing for the services has not yet been set, Advantis officials said.

New sites

• The Institute of Electrical and Electronics Engineers, Inc. (IEEE) home page (http://www.ieee.org), a separate page and complete issue of *The Institute*, a news supplement to IEEE's *Spectrum* magazine (http://www.ieee.org/ti.html).

• United Nations links, a Web page with links to information services at the UN (http://undep.org/unlinks.html).

• Disability Mall, the first Web page for people with disabilities (http://disability.com/).

Just for fun

• The Real Beer Page, for devotees of craft brewing (http://and.com/realbeer/).

▪ VolcanoWorld. This Web site, funded by NASA, includes reports and pictures of the latest eruptions, photos of many other volcanoes, a developing virtual field trip and more (http://volcano.und.nodak.edu).

Tips and tricks

• The second edition of *The Internet Yellow Pages* (Osborne McGraw-Hill, $29.95) by Harley Hahn and Rick Stout. The authors have succeeded again in putting information about the most dynamic place in the world, the Internet, between two familiar covers. Best of all, the *Yellow Pages* is as witty as it is informative.

▪ One of the best jump-off points for 'net surfing is the Yahoo directory (http://akebono.stanford.edu/yahoo). This Web location, maintained by students at Stanford University, contains more than 25,000 uniform resource locators in its searchable database. More than 700,000 files are accessed from the site daily.

— Ellis Booker

Please keep us posted about items in this space. Contact us electronically at ellis@cw.com.

Networking standard promises clear picture

By Steve Moore

Building and maintaining an accurate map of a multivendor computer network is often an exercise in frustration. While a motorist can easily obtain a single map showing all the highways and byways in every state and county nationwide, a network manager must piece together maps of overlapping, vendor-specific domains that vary widely in geographic scope.

To ease this problem, Cisco Systems, Inc. in San Jose, Calif., recently launched an effort to develop a common format called Common Internetworking Topology Initiative (CITI). This was designed to allow different vendors' internetworking devices, network management platforms and network design and optimization tools to share configuration information (see chart).

The CITI, a standards group, is developing an ASCII-based, common interchange format with E-mail capabilities. This will allow a network manager to consolidate topology information from many different vendors' management tools into one cohesive network diagram.

VENDORS THAT HAVE AGREED TO PARTICIPATE IN THE CITI EFFORT INCLUDE THE FOLLOWING:

- Accugraph
- Cabletron Systems
- Chipcom
- Isicad
- KI Networks
- Optical Data Systems
- Remedy
- SunSoft

Vendor reaction

Cisco plans to present CITI to the Internet Engineering Task Force as a potential formal standard. But whether CITI will attract broad support and be implemented quickly is still up in the air. Although some industry heavyweights, including Cabletron Systems, Inc. and SunSoft, Inc., have supported it, others such as Hewlett-Packard Co. and Bay Networks, Inc. are still evaluating it. And IBM has declined to support it altogether.

"We think it's important to work through established standards bodies like the Internet Engineering Task Force, the Network Management Forum and X/Open," said Lynn Wilczak, IBM's director of enterprise management platforms. "The resources it takes to put the right attention on all these separate small groups that are starting to form dilutes the [standards] effort overall," she added.

User reaction

Still, customers said they would welcome the standard. "It would be wonderful to see some standardization of network diagrams," said John Dubiel, manager of planning at Boston Edison Co. in Boston. However, he cautioned, "All the players have to play or it becomes a partial solution, and we're already being partial-solutioned to death."

Currently, getting an overall snapshot of a multivendor network "is virtually impossible from any one vendor console," said Fred McClimans, a principal consultant at Decisis, Inc. in Herndon, Va. The problem will only worsen as users implement "massive switched networks where topology information becomes critical because LANs are breaking up into multiple segments," he added.

Fireman's Fund Insurance Co. in Novato, Calif., avoided the problem of multiple, inconsistent topology formats by "standardizing early and sticking to our guns," said Virgil Pittman, the company's senior vice president of systems.

Fireman's uses IBM's NetView, is standardized on OS/2 workstations and has an internetwork based on IBM 3274 controllers rather than routers, he said. "Unless [the CITI participants] standardize on what I have now, I'm not going to spend a lot of money to go to a new standardized way of doing things," he said.

Speedy resolution

For companies that have not been so fortunate in building consistent computing and networking environments, CITI could bring significant benefits. "The thing that will make this initiative happen is to keep it simple technically and bring it to closure quickly. But if it takes three years to become official, who cares?" said John McConnell, president of McConnell Consulting Co. in Boulder, Colo.

Vendors of network design and optimization tools have expressed interest in the CITI effort, but none have become members yet. "The concept of a common [topology] interface standard is a good one, but it only solves part of the problem," said Steve Howard, president of Make Systems, Inc. in Mountain View, Calif.

There are key attributes that should be in the core standard but are not, Howard said. If, for example, his company's application requires something not provided in the standard, then Make Systems must somehow reconcile that problem, he said.

While different network management applications may produce diagrams that are functionally correct, Dubiel noted, "they don't come out physically the way you'd like them to look. You'd like some geographic sensibility to it, so the 20th floor doesn't end up higher on the diagram than the 19th floor."

Beyond the topology format issue looms the more difficult problem of standardizing the format of network traffic flow information. This would allow users to get a clear picture of the types and amounts of data traversing a network, even if many portions of that data are associated with different vendors' networking products.

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Electronic currency: A cash cow

By Gary H. Anthes

Just as currency long ago replaced barter in our society and more recently paper checks and plastic cards have supplanted currency, electronic payments may soon be an important — perhaps dominant — way to settle accounts.

Developers of electronic payment methods said the technology holds great promise for publishers, corporate users looking for a safe, inexpensive and easy way to make purchases and companies that see the technology's potential in billing and collection systems.

But a lack of standards and a host of thorny legal and political issues suggest that the widespread use of network-based payment mechanisms will not occur overnight (see story below).

Some of the emerging electronic payment methods are based on ordinary credit-card transactions, which are protected by encryption for transmission over networks. Others resemble checks, and still others are more like cash. University research as well as fledgling commercial efforts are attempting to combine the advantages of these familiar mechanisms while sidestepping their respective drawbacks.

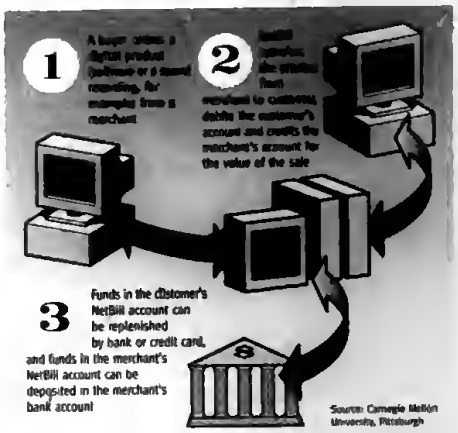
Reducing risk

For example, CyberCash, Inc. in Reston, Va., said its Internet-based credit-card service will use encryption technology to reduce the risk and cost associated with the use of credit cards by mail or telephone. CyberCash recently teamed with Wells Fargo Bank in San Francisco to introduce a service for electronic buying using credit cards.

Later this year, CyberCash plans to provide a hybrid service intended to offer the convenience of checks and the reliability of cash. Like a check, it can be used at a distance, but like cash, its validity can be verified instantly, said Stephen D. Crocker, senior vice president for development.

CyberCash uses encryption technology and a server that mediates transactions among buyers, sellers and banks. In the case of electronic cash, it receives, holds and transfers money balances much as a bank does.

Electronic cash is attractive when purchases are too small to be cost-justified as credit-card transactions, as when a user wants to buy a small amount of information from an on-line service provider. Carnegie Mellon University in Pittsburgh has developed NetBill for electronic "micropayments," which can be used reasonably for purchases as low in value as 10 cents, its creators said (see chart).



Systems such as NetBill will make it safe and feasible for publishers to sell information over the Internet, a distribution medium shunned by them so far. NetBill allows the publisher to send encrypted information to a buyer without sending the key to decrypt the file until a NetBill server has debited the customer's account and credited the vendor's account.

The university will set up a NetBill pilot by the end of the year and will eventually license the technology to one or more commercial services firms, the university said.

Another effort soon to go commercial is under way at the Information Sciences Institute (ISI) at the University of Southern California in Marina Del Rey. The technology is based on Kerberos security software, which allows access without sending passwords over the network.

ISI's NetCheque, which will be used in commercial applications by CyberSafe Corp. in Redmond, Wash., uses an "accounting server" — acting as a virtual bank — to allow electronic check-writing. This will let companies set up their own on-line "banks," integrating their internal accounting systems with the external banking hierarchy.

Mixed signals?

In the past year, a dozen or so firms have announced plans to offer products or services based on electronic credit-card, debit-card, check or cash transactions over the Internet. Will they result in a digital Tower of Babel?

"The hope is if you get a payment in one of these forms, you will be able to convert it automatically to another," said Clifford Neuman, a computer scientist at the ISI at the University of Southern California. "But I think it's going to be a while before we see that. First we'll go through a period where a lot of things don't talk to each other, unfortunately."

A lack of standards for interoperability is not the only impediment to the widespread use of electronic cash. Last year, the Cross-Industry Working Team, a group of communications, computer, information and service providers, said in a report that digital cash raises issues of safety, privacy, regulation, administration and computer crime that have barely been considered, much less solved.

"The decisions and collective wisdom not just of financial and technology experts but of public policy-makers and ultimately of ordinary consumers, will be needed to realize the potential benefits of this emerging technology," the group wrote.

— Gary H. Anthes

Elcon Technology Corp. has announced Universal Access, PC-to-SNA software.

According to the Montreal company, Universal Access includes 3270 and 5250 clients for Microsoft Corp.'s Windows, Windows NT, DOS and OS/2.

The product comes with Advanced Program-to-Program Communications subsystems for DOS and Windows that provide access to mainframe, midrange and peer-to-peer resources. Access Tools, a set of Visual Basic controls for developing front-end and client/server applications, is also included.

Universal Access software is priced at $21,875.

▶ *Elcon Technology*
(514) 631-2592

T3plus Networking, Inc. has announced T3plus Command Management System software.

According to the Santa Clara, Calif., company, T3plus Command Management System manages high-speed broadband communications among multiple locations in point-to-point configurations.

Users can perform management functions across all network nodes at one time instead of on a node-by-node basis. Other features include circuit additions, deletions or modifications and fault management.

T3plus Command Management System costs $4,000.

▶ *T3plus Networking*
(408) 727-4545

Router vendors emphasize integration

By Stephen P. Klett Jr.

■ To compete in the low-end router market, vendors are struggling to leapfrog one another by cramming as many bells and whistles as possible into their platforms while keeping prices low.

Micom Communications Corp. and Dynatech Communications, Inc. threw their respective hats into the ring recently.

Micom, based in Simi Valley, Calif., unveiled the NetRunner integration Router family at last week's ComNet trade show in Washington. NetRunner, which supports Novell, Inc. IPX and TCP/IP routing, will integrate voice, fax, legacy and LAN traffic. Two branch office and two central site models are included in the family. Prices range from $2,450 to $12,000.

On the rise

Metric Technologies in Boston estimates WAN traffic growth will be in excess of 30% a year.

Dynatech Communications, a subsidiary of Dynatech Corp. in Woodbridge, Va., last week launched the DynaStar 100 router targeted at branch office networks. The DynaStar 100 supports concurrent IP and IPX routing over wide-area via frame relay and X.25, and it offers bridging and LAN dial-in/dial-out capabilities. Prices start at $2,495.

The DynaStar 100 also offers an expansion slot to which users can add more Ethernet, Token Ring, Integrated Services Digital Network (ISDN) or wide-area network ports. It supports Simple Network Management Protocol management and remote reconfiguration and software updating, Dynatech officials said.

"Remote-access vendors are consolidating a lot of functionality into a single box, which is good because as a branch manager you really want to have a multifunction platform to help reduce management costs," said John Morency, principal analyst at Strategic Network Consulting in Rockland, Mass.

Users agreed.

"Remote routers have to be cheap and easy to maintain. You have to be able to put them on the top of a shelf somewhere and forget about them," said Bill Blackmer, senior information support analyst for Marin County in Novato, Calif. "If not, we're in deep doo-doo because we'd have to hire eight more of me just for" router management, Blackmer added. Remote routers from 3Com Corp. play a crucial role in the county's ongoing project to link area schools and businesses to a countywide internetwork [CW, Nov. 21, 1994].

To help ease the administrative burden associated with multiprotocol routing, Micom includes a technology called EasyRouting with the NetRunner line. EasyRouting software eliminates the need to set up and maintain complex routing tables and performs local protocol "spoofing" to keep local broadcast traffic off the WAN, Micom officials said.

Connectivity overload

Branch office routers are becoming increasingly flexible

Vendor/ product	Features	Price
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Analysts and users praised the feature sets the two companies brought to the remote-access table but added that both have a huge mountain to climb to compete with the likes of Cisco Systems, Inc., Bay Networks, Inc. and 3Com.

"Any new player in the internetworking market is at a disadvantage in competing with the name brands of the entrenched players. A lot of their success will depend on how well they interoperate" with routers from the bigger companies, Morency said.

Name recognition is also a challenge.

"Dynatech is a $500 million company, but when you mention their name, people say, 'Who?' " said John Holdefehr, assistant vice president of network operations at Shaw Data Services in Fairfield, N.J., which is beta-testing the DynaStar routers.

"Reliability is our No. 1 concern, and since Dynatech is new, we will have to do very rigorous testing before we roll them out to our clients," Holdefehr said. "However, on paper they are the vendor that best meets our needs."

He said he particularly likes the DynaStar 100's ability to send mainframe traffic over the LAN using frame relay as well as its ISDN support. Shaw Data could be a big win for Dynatech. The portfolio management company has hundreds of clients in the U.S., and if all goes well with the pilot, a majority of them may be outfitted with Dynatech routers by the end of the year, Holdefehr said.

Briefs

NetLabs' debut

NetLabs, Inc. released a version of its NetLabs/Vision Development Environment, which runs on IBM's AIX, Hewlett-Packard Co.'s HP/UX and Sun Microsystems, Inc.'s SunOS platforms. It lets network administrators create Open Software Foundation Motif applications to visually control, configure and monitor Simple Network Management Protocol devices on TCP/IP networks. The product is available for $10,000 per development station.

House goes on-line

The U.S. House of Representatives' World-Wide Web site (http://www.house.gov) went into operation last week. The House Web site uses text-search software from Personal Library Software, Inc. in Rockville, Md. Users will be able to search U.S. Code and the Code of Federal Regulations as well as follow links to legal works.

Wireless messaging

Pagers boost mobile arsenal

By Michael Fitzgerald

Paging may be part of your messaging future.

Socket Communications, Inc., a small maker of PC Cards in Fremont, Calif., is working with Paging Network, Inc. and its PageNet network to make paging more attractive to companies with large numbers of mobile users. The Socket/Paging Network combination is the key to Apple Computer, Inc.'s Apple Mobile Message system announced at Macworld two weeks ago. And Socket Communications and Paging Network are expected to roll out the PageCard Wireless Messaging System for Windows today.

For $399, a user gets a Type II PC card with a pager window on it. The card fits into a notebook or other portable device with a PCMCIA slot and can be used as a stand-alone pager. The PageNet service costs $19.99 to activate, and the lowest monthly charge is $19.95 for 75 messages.

The initial service will support Microsoft Corp.'s Mail messaging package. Lotus Development Corp.'s CC:Mail will be supported in March, and support for Novell, Inc.'s Message Handling Service is expected in early April. Support for Notes is scheduled for June.

The PageCard Wireless Messaging service will help lower costs, according to the two companies. For instance, instead of having to log on to receive messages, a user with PageCard can simply plug the card into a notebook to read messages on screen.

Cost-saver

Murray L. Dennis, Socket's president and chief executive officer, said a message can be sent to one person or 1,000 people for the same price over the PageNet network. This would reduce the amount of time mobile workers spend on-line and achieve lower telephone costs than in a wired environment, he said.

"That is potentially interesting. We could utilize that because we use the text-based pagers now," said Kyle Cooper, a telecommunications specialist at the American Cancer Society in Austin, Texas.

Cooper said he would have to examine PageNet closely because much of the group's paging is focused in its major sites in Austin and Atlanta. If a large group of people were traveling in the field, the network would have much clearer benefits, Cooper said.

PageCard *users can plug the card into a notebook to read messages on screen*

One advantage of the PageCard is that it is not limited to short, bursty messages like the typical pager. It has a 128,000-character memory. In conjunction with a messaging program, PageCard users can define what messages they want to receive according to subject, sender or other criteria for automatic forwarding to their location.

The product is limited to mail-forwarding applications but will expand to broader corporate mail networks, particularly as Socket increases its support for market-leading messaging vendors.

Depending on user response, Socket will also pursue links to Profs networks on IBM mainframes and DECmail for Digital Equipment Corp.'s large systems.

Top dog

PageNet is the dominant paging network in the U.S., with 4.3 million subscribers. The next three largest paging companies have 4.4 million subscribers, according to RCR Publications, Inc. in Denver.

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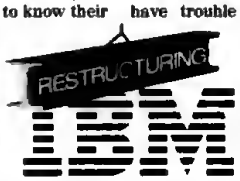
Users laud IBM reorganization — for now

By Craig Stedman

A new sales and service organization built around 13 vertical industries has formally taken effect at IBM. The move was met with applause from customers, who said they hope the changes will help the computer giant get to know their businesses better.



"It's too early for me to tell that it's been a success, but clearly the intent is correct," said Jon Gorney, executive vice president of National City Corp., a Cleveland-based bank.

Some of the 13 new vertical units are further along than others, "but everything has an industry focus," an IBM spokesman said. The company began reorganizing along vertical industry lines last spring (CW, April 25, 1994), and the new structure was gradually put in place during the remainder of 1994. It officially took effect at the start of the new year.

However, some users noted that the downsizing of IBM's sales force in recent years remains a big concern. Customers outside of the top tier of IBM accounts sometimes have trouble getting attention, these users said, and even large shops have seen sharp cuts in the number of IBM workers assigned to them.

While several IBM customers said the impact of the changes cannot be rated yet, they gave the vertical industry concept a strong thumbs-up.

Lee Nelson, chief financial officer at Color Me Beautiful, Inc., a small cosmetics vendor in Chantilly, Va., said he lobbied IBM to move to a vertical industry focus when he sat on its customer council several years ago. The change should help produce salespeople who "come in and know what we're all about" rather than having to take lessons from users, he said.

Being able to tap the knowledge base of a vertical industry unit would be especially beneficial to a company the size of Color Me Beautiful, which cannot afford to maintain a large information systems staff, Nelson added.

Kansas City Southern Railway Co. in Missouri has shared an IBM account team with two other transportation concerns in that area for the past three years. The arrangement has helped it get input on technology "from the outside world," said Wayne Pattison, director of data center operations.

"I don't know if we've gotten better service from IBM, but the people that call on us are more attuned to what we do and what we're all about," Pattison added. "We don't have to explain to them what's going on, and that's a plus."

Ed Webner, manager of business information systems at MEMC Electronic Materials, Inc. in St. Peters, Mo., agreed that the vertical industry structure is "a good idea." But he said his company, a maker of semiconductor wafers, is having trouble just getting in touch with its local IBM sales office.

With all of the cutbacks made by IBM, "they're spreading things a little bit thin," Webner said. "That's where this [reorganization] is kind of falling down." MEMC has to rely on personal relationships it developed in recent years with IBM's development and support groups, he added.

Other users have also complained about a reduced level of attention in the wake of IBM's downsizing. Gorney said National City's IBM account team had been cut from 16 to nine in recent years but without a major impact on the level of service the bank receives.

Take responsibility

IBM managed to carry off the sales force reorganization without any noticeable impact on revenue, which exceeded expectations in each of the past three quarters, said Sam Albert, an independent consultant in Scarsdale, N.Y. The new structure puts the onus for meeting revenue targets squarely on the shoulders of the vertical unit managers, he added. "Pointing to IBM's product divisions is not an excuse anymore."

Waste-to-energy firm uses imaging to dam paper tide

By Thomas Hoffman
FAIRFIELD, N.J.

ON SITE

Ogden Projects
Fairfield, N.J.

Challenge: To implement an automated system that will improve the high-volume production of paperwork among the unit's 28 waste-to-energy treatment plants.

Technology: IBM 3995 Optical Library Data Server; Kodak High-Volume Image Link 900 Scanner; IBM AS/400 Model 310; and IBM ImagePlus/400 and ImagePlus/Workstation software.

Result: Retrieval of invoices improved from 30 minutes to a matter of seconds; return on investment expected in 3½ years.

For a company that manages 28 waste-to-energy facilities throughout North America, Ogden Projects sure had a lot to learn about conservation.

That is because the $700 million subsidiary of New York services giant Ogden Corp. used to store all of its purchase orders, invoices and other back-office accounting documents from its energy plants in a mountain of paper files here and at a records retention warehouse in Newark, N.J. But that has all changed with the recent installation of an IBM AS/400-based imaging system designed to streamline the flow of documents among Ogden Projects' facilities, which are as far-flung as Dartmouth, Nova Scotia, to its headquarters here.

When the company broke ground for its newest facility in Montgomery County, Md., in 1993, "We estimated our paper flow at 2 million pieces a year and counting," said Donald F. Warga, manager of systems and programming at the unit. "Obviously, we had to find a better way to manage our internal paper flow."

Best way to proceed

Ogden Projects did not decide to install an imaging system until a group of IBM consultants reviewed its operations in March 1993. Ogden Projects hired IBM to determine how it could best redesign its storage and retrieval operations to handle the vast amount of paperwork the company is legally bound to preserve for all of its plants.

Following the study, Ogden Projects decided to maintain the past three years' worth of documentation from each plant at its Newark, N.J., records center for legal purposes. The company also decided to funnel its daily volume of paperwork through the imaging system, Warga said.

"Every time Ogden Projects built a new facility, they generated additional paperwork and needed extra clerical staff to handle it," said Joanne O'Neill, an IBM image consultant.

For example, Ogden Projects already had a computerized accounts payable system in place, but that merely tracked the paperwork manually — a tall order for a unit that handles more than 50,000 claims a year from as many as 12,000 vendors.

Donald F. Warga says Ogden Projects *was motivated to find a better way to handle the 2 million pieces of paper it generated in 1993*

So in June 1993, Ogden Projects moved forward on Armonk, N.Y.-based IBM's advice to install an imaging system. The system, which cost approximately $500,000, includes an IBM 3995 Optical Library Data Server and an Eastman Kodak Co. High-Volume Image Link 900 Scanner. The hardware, which runs off of Ogden Projects' AS/400 Model 310 machine, is operated using IBM's ImagePlus/400 software.

Warga said he expects the system, which has been in production since January 1994, to pay for itself in 3½ years.

Easing the load

A few of the 12 staffers who manage Ogden Projects' accounts payable department said the system has helped make their workload more manageable this past year.

"We're dealing with so much volume here that it really makes a system like this viable," said Ed Anderson, an imaging clerk who was hired last November to scan the documents into the system. "Rather than having three years of files in this building, the imaging system takes up a lot less space," Anderson added.

"I think it's wonderful," said Jayne Gorab, an accounts payable clerk who is linked to the system through an IBM OS/2 gateway. "It's so much easier to sit at your desk and retrieve files on your computer screen than to get them from the file room."

In the past, Gorab said, it took her up to half an hour to locate an invoice in the file room and

Waste to energy, *page 61*

Progress introduces application developm

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Responsibility stays in-house in outsourcing partnership

By Mark Halper

Plenty of outsourcing deals have been cut over the years in which a team of vendors provide a swath of services with each team member providing a specialty such as data center outsourcing or LAN support.

But usually in these team arrangements, the customer designates one provider as the lead contractor, and that contractor serves as a single point of contact, assumes risk and has the ultimate responsibility for the project.

So outsourcing industry watchers agreed that the recent 10-year, $500 million contract signed by Houston-based Halliburton Energy Services was unusual. While Halliburton handed over the bulk of its information technology operations to Andersen Consulting, I-Net, Inc. and Power Computing Co., it did not name any of the three as the prime contractor.

Halliburton CIO Dick Teel *says, 'We felt we could better manage than any of the contractors could'*

Instead, Chief Information Officer Dick Teel said Halliburton signed separate contracts with each company and held on to management responsibilities itself.

"We felt we could better manage than any of the outsourcers could," Teel said. Halliburton chose the combination of vendors because it promised more variety of expertise than could a single vendor, he said.

Sharing the wealth

Halliburton's contract with I-Net calls for the two companies to share the revenue derived when Halliburton brings one of its customers into I-Net's global telecommunications network. Halliburton sells oil exploration services to oil companies, many of which require satellite telecommunications in remote areas of the world.

The arrangement calls for Power Computing in Dallas to provide data center management, for Andersen in Chicago to provide application maintenance and client/server development and for I-Net in Bethesda, Md., to provide global networking and LAN support.

"One of the disadvantages of the traditional prime/sub arrangement is sometimes you want to get to the [subcontractor] and the prime is in the doorway standing in the way," Teel said.

Steve McClellan, an outsourcing industry analyst at Merrill Lynch & Co., said he understood the sense in Halliburton's approach. "You don't see it happen very often that responsibility isn't given to a single vendor. But you keep a lot of control that way," he said.

Rudy Hirschheim, an outsourcing consultant and professor of information technology at the University of Houston, predicted that the "no prime" arrangement will become more common because prime contractors add cost by charging for risk and responsibility.

A potential downside to Halliburton's decision not to name a prime contractor is coordinating all the vendors. No one seemed more aware of that possibility than Teel, who also said he recognizes the potential for vendor finger-pointing if things go wrong.

To minimize potential conflicts, Halliburton and the three vendors signed a joint vendor management agreement that spells out each vendor's precise responsibilities.

Some industry watchers were skeptical about that arrangement. "It's kind of like the United Nations has rules of conduct. Good luck; it doesn't always work," McClellan observed.

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Waste to energy

CONTINUED FROM PAGE 57

copy the necessary information. Now that those invoices are scanned and made available to users on-line the next business day, she can key in the invoice numbers to access a file within seconds.

Although some of the seasoned accounts payable clerks were initially computer-phobic, they eventually took a liking to the system after they discovered how easy it was to use, Anderson said. The imaging system "takes some getting used to, but once you're using it, you don't even think about it," Gorab agreed.

Look out for bugs

But despite its benefits, the imaging system still has a bug or two that needs to be worked out. For example, every so often, Gorab will receive a "document not found" message when she tries to retrieve a file. Warga said the company is solving some of these glitches, most of which are problems with the scanner, by rescanning the documents. "It's going to be a daily cleanup procedure," Warga added.

Ogden Projects is in a horse race with Wheelabrator Technologies, Inc. in Hampton, N.H., for the top spot in the North American waste-to-energy industry. Both companies have been challenged by legal issues that have popped up among local county governments, such as whether municipalities have the right to dictate where waste in their area can be sent for conversion to energy. Those are among the forces helping to fuel Ogden Projects' and Wheelabrator's nascent international expansion, according to Marc Sulam, a financial analyst at Donaldson Lufkin & Jenrette, Inc. in New York.

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Consistent Architecture with SP2	No	Yes
Index Scan	No	Yes
Inserts	No	Yes
Selects	Yes	Yes
Updates	No	Yes
Deletes	No	Yes

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ExecuSoft Systems, Inc. has announced ExecuSoft Office 2.0, a set of client/server applications for the IBM AS/400.

According to the Wayzata, Minn., firm, ExecuSoft Office 2.0 includes a 5250 emulator, a Windows-based PC support router replacement, a Windows AS/400 File Manager and a read/write Open Database Connectivity (ODBC) driver.

The ODBC driver will link most Windows applications to the AS/400 database. The File Manager module provides a standard Windows File Manager interface that lets users set up and initiate file transfers to and from the AS/400.

The product's 5250 emulation supports Windows standards and provides standard workstation functions, display station pass through, keyboard mapping, keystroke recording and playback capabilities.

ExecuSoft Office 2.0 costs $345.

▶ *ExecuSoft Systems*
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J. D. Edwards & Co. has announced WorldVision, PC-based windowing software that provides point-and-click access to J. D. Edwards' IBM AS/400 applications.

According to the Denver company, WorldVision maps AS/400 information into a Windows-style environment and provides users with a low-risk, client/server-style presentation.

WorldVision Run-Time Library incorporates all J. D. Edwards standard screens, and WorldVision Development Workshop tool kit lets users convert custom screens to WorldVision format.

A standard WorldVision configuration of 60 to 90 users costs $30,000.

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Panel:
Steve Brooks, Executive Director of IS, Walt Disney Company

David P. Rodger, Vice President, Corporate Architecture, Sequent Computer Systems, Inc.

Tom Robben, V.P., Application/ Strategic Architect, Core Cash & Security Systems, J.P. Morgan

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Panel:
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Robert Yellin, Chief Technology Officer, Legent Corporation

William Zeitz, President, Zeitz & Associates

Mobile/Wireless Computing

Leader:
Andrew M. Seybold, Editor-in-chief, *The Outlook on Mobile & Professional Computing*

Panel:
Enrique Crespo, Manager of Corporate Sales Systems, The Torrington Company

Chuck Parrish, General Manager, Mobile Data, GTE

Mike Radigan, Program Manager, USCO market-to-collections, Xerox Corporation

Sandy Sully, Vice President of MIS, 3Com Corporation

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Panel:
Michael Abbey, Database Administrator, Auditor General's Office of Canada

Ronald S. Elkin, Program Manager, Battelle Memorial Institute

High-end updates target Visual Basic

Vendors address trend with expanded capabilities

By Elizabeth Heichler

High-end client/server tool makers Cognos Corp. and Progress Software Corp. are giving their customers more options for using Microsoft Corp.'s Visual Basic.

In recent weeks, Cognos in Burlington, Mass., disclosed plans to include a Visual Basic-compatible scripting language and event-driven form designer in the next release of its Axiant client/server development environment (see story at right). Meanwhile, Waltham, Mass.-based competitor Progress likes Visual Basic so much it bought a company — Crescent Software, Inc. — that manufactures add-on products for developers using the language.

Users and other observers welcomed both vendors' plans.

At Dominion Textile, Inc. in Montreal, Visual Basic is now making inroads in what has been primarily a Cognos PowerHouse shop, according to Chief Information Officer Warren White. "It's good news to me that Cognos is bringing in Visual Basic capabilities," White said, adding that he would like developers to be able to code in Visual Basic within a robust environment such as Cognos' rather than have to use only the Microsoft language as a front end.

The moves by Cognos and Progress are part of an emerging trend, according to Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass. "Companies with high-end development systems say, 'There are as many as 1 million active Visual Basic users, and they're going to start hitting the wall. Why not go after them?'" she explained.

"There's a lot of momentum growing behind Visual Basic. This is an example of two established players lining up to add to that momentum," concurred Ed Acly, a director at International Data Corp. in Framingham, Mass. He said he expects more companies to begin focusing attention on Visual Basic.

Total package

Cognos customer David R. Doucette, a project manager at Wellesley, Mass.-based software vendor MultiTasking Systems, Inc., said he looks forward to being able to use a Visual Basic-compatible language from within Axiant.

"Visual Basic has a lot of good points, but it's still" a third-generation language, he said.

MultiTasking sells a lease accounting application. The company used Powerhouse Client for Windows to develop the front end for one product and Visual Basic to design the front end for another. Doucette said he hopes his company will be able to merge the two products when Axiant 2.0 is delivered later this year with the promised enhancements.

By enhancing Axiant with VisualWare, an event-driven screen painter that Cognos has licensed from InterGroup Technologies in Bellevue, Wash., the company will help resolve a problem another user has had with Axiant 1.0.

"The most disappointing thing has been that the GUI isn't what we'd like. That's why we're really pleased with Cognos' plans; it gives us everything we want," said Rob Wilson, a director at Information Specialists Ltd. in Cheshire, England. Wilson has been using the first release of Axiant to develop a project-tracking application for the construction industry.

The growing number of software components available to Visual Basic developers is also attractive to Wilson. "We want to plug in third-party technology whenever possible so we don't have to reinvent the wheel," he said.

Progress' acquisition of Crescent will help legitimize the Visual Basic market by creating a solid, reliable source of compatible software components, said Ron Kalin, vice president of engineering at Business Matters, Inc., a customer fi-

Visual Basic, *page 65*

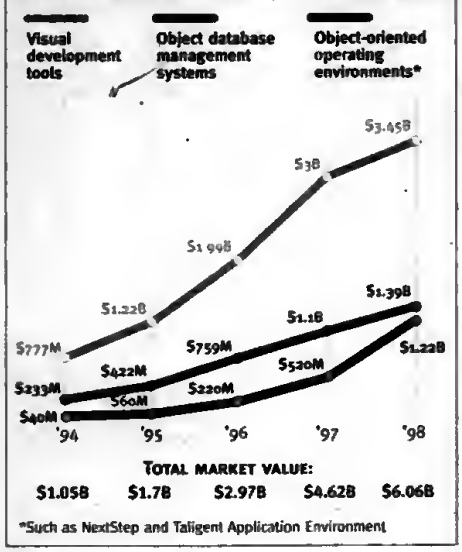
What's in store

Fourth-generation language vendors' plans to win Visual Basic users include the following:

- Cognos: The next release of client/server development environment Axiant, due in the fourth quarter, will include VisualWare, an event-driven, Windows-based forms designer from InterGroup Technologies in Bellevue, Wash. Axiant 2.0 will also include Softbridge Basic Language, a Visual Basic-compatible, embeddable scripting language from Mystic River Software in Cambridge, Mass.
- Progress: The company plans to support Visual Basic Custom Controls this year in Progress 7. It is also evaluating support for Microsoft's Object Linking and Embedding 2. Subsidiary Crescent Software will aim to deliver EnQuiry, a visual database application development tool, in the second quarter. Also on tap from Crescent is a Visual Basic compiler code-named "Stingray," which the firm claims will improve the performance of many Visual Basic applications when it is released in the second half of the year. — *Elizabeth Heichler*

Data View

Worldwide market forecast for object-oriented platforms



*Such as NextStep and Taligent Application Environment

Source: Input, Mountain View, Calif.

IBM's little database faces big battle

By Kim S. Nash

IBM announced a skinny single-user database last week aimed at consumers and small businesses. Due for delivery in mid-1995, Ultralite is IBM's answer to PC-based databases from Lotus Development Corp. and Microsoft Corp., officials said.

But IBM faces a strenuous workout on the industry Stairmaster to coax non-IBM shops to adopt its slim 4M-byte database, users and analysts said last week.

Crowded field

Microsoft's Access and Lotus' Approach are entrenched, and Oracle Corp. recently joined the junior database club with Personal Oracle 7 [CW, Jan. 16]. Sybase, Inc. plans to address the issue with the Watcom database it is expected to acquire via its proposed merger with Powersoft Corp.

Critical for any new database is support from third-party developers, which may or may not choose to write applications for the product. But the jury is still out. "I'd consider supporting it if it gained market share in six months," said

Ultralite facts

Footprint:	4M bytes
Platform:	OS/2 Warp; support for Windows 95 is planned
Price:	Less than $100
Channels:	Retail stores or direct from IBM; Internet availability under discussion

David Gottholm, president of Eclipse Technology, a developer in Nashville.

IBM plans to bundle Ultralite with DB2 brethren databases in workgroup packages late this year, but for now, Ultralite is aimed at home buyers more than corporate users. The product, to be priced at less than $100, will include applets for "those catchy things people want to do at home," said Janet Perna, director of database technology at IBM's Toronto laboratory.

For example, when Ultralite hits the shelves at retailers such as CompUSA and Egghead Software in a few months, the package will come with programs for managing personal finances, tracking home wine cellars and keeping lists of phone numbers, she said.

The product will talk to other end-user applications through Open Database Connectivity links. Support for Microsoft's Object Linking and Embedding and OpenDoc, a connectivity standard under development mainly by IBM, Apple Computer, Inc. and Novell, Inc., could appear in Release 2.0 of Ultralite, Perna added.

Software AG to revamp state tax system

$15 million deal involves Natural, Adabas

By Rosemary Cafasso

The California State Board of Equalization — essentially the state's tax man — plans to spend $15 million in the next two years to revamp its legacy systems into one integrated set of tax applications.

Earlier this month, the agency announced a deal with Software AG of North America, Inc. in Reston, Va., to purchase the Adabas database management system along with Natural, a fourth-generation language (4GL), and a series of Natural development tools.

Efficiency is vital

The idea is to get rid of inefficiencies in tax management and processing that have resulted from relying on dozens of separate applications, said Burt Oliver, executive director of the California State Board of Equalization in Sacramento. Many of the applications were written in the 1960s and over the years have been patched and modified. Some have duplicate data and none of them can share information, Oliver said.

"Because of the way our tax programs grew, we have different [software] for each tax," Oliver said. "It is very inefficient and difficult to deal with."

Just one example: The sales tax systems alone work with a million active accounts at any given time, Oliver said.

To pull off this overhaul, the information systems staff will comb through current applications, collect common data, store the data in a new Adabas database and then rewrite applications to work with the new database management system.

The California State Board's Burt Oliver *says a revamp is needed to expedite tax processes*

The State Board of Equalization administers most of California's major state taxes, including consumer-use taxes such as excise, alcohol and cigarette taxes. In its 1993-94 fiscal year, the state pulled in $26.9 billion in revenue for state and local governments. To some observers, the Software AG contract is a thumbs-up for the soup-to-nuts development approaches that include the database, language and tools from a single source.

> The California State Board of Equalization processes about 100 000 transactions per day using a combination of 540 on-line applications and 710 batch programs

"The thrust so far [in the market] has been on the new wave of products," said Ed Acly, an analyst at International Data Corp. in Framingham, Mass. "But Natural is an extremely robust 4GL. So the idea that the old stuff isn't good anymore isn't always accurate."

Other observers, however, said they consider the deal just another example of an old-line company mining its customer base.

"There's no question that Software AG has landed some big contracts, but most of the time they have been selling into their installed base," said Donald Feinberg, an analyst at Gartner Group, Inc. in Santa Clara, Calif.

Although Software AG is a long-time software provider to the state of California, it won this bid over 10 other vendors, Oliver said.

"In terms of performance, flexibility and moving to client/server, we concluded that Adabas and Natural were the best and safest," said Bob Ferguson, a manager in the agency's IS group.

The agency kicked off the project in late 1994 and plans to complete development by May 1997. The staff has moved beyond planning to "requirements analysis," Ferguson said.

Briefs

XDB branches out

XDB Systems, Inc. in Laurel, Md., will embed its XDB Lite database into development tools from Symantec Corp., Micro Focus, Inc. and Platinum Technology, Inc.

Hitachi seals middleware deal with IBM

Hitachi Ltd. in Japan has signed a deal to develop message-oriented middleware based on IBM's MQ Series technology. The Hitachi product, due out by September, will be written to the MQ Series application programming interface that controls messaging among different computer systems, the companies said. Hitachi initially plans to bundle the middleware with its transaction processing software for workstations and mainframes. The deal is the first time IBM has licensed the MQ Series to another vendor.

Informix buys part of ASCII

Informix Corp. in Menlo Park, Calif., has purchased the database division assets and software licenses of ASCII Corp., a leading Japanese software firm in Tokyo. Price was roughly 4.2 billion yen or $42 million.

OMG adopts object standard

The Object Management Group (OMG) in Framingham, Mass., has adopted the Common Object Services Specification Volume 2 (COSS 2), a specification on how to build four basic services into a Common Object Request Broker Architecture (CORBA) environment. COSS 2 will provide CORBA-conformant object request brokers with object transaction, externalization, relationship and concurrency control services.

Powersoft doubles 1993 revenue

Powersoft Corp. in Concord, Mass., last week reported 1994 revenue of $132.5 million, more than double its 1993 revenue of $57 million. The company also reported fourth-quarter results with net income of $4.2 million on revenue of $40.5 million.

Speedware Corporation is an international organization with 25 offices around the world, thousands of satisfied customers, and products with a proven track record.

Premia Corp. has announced Codewright Professional 3.1, an editor for C/C++, Assembler, XBase, Pascal, Cobol, Borland International, Inc.'s Paradox and Microsoft Corp.'s Visual Basic.

According to the Portland, Ore., company, Codewright Professional 3.1 lets users switch among build, file find, browse and other output windows.

A VDOS command shell lets users interact with DOS commands and associated output in a Codewright edit window, and a Help Indexer scans and indexes and a system's help file. The product lets developers extend search-and-replace operations across a list of project files in a single operation.

Codewright Professional 3.1 costs $249 for a single user or $995 for a five-user license.

▶ *Premia*
(503) 641-6000

Business Tools, Inc. has announced TAS Professional 5.0, a fourth-generation language database application development environment for DOS.

According to the Chapel Hill, N.C., company, TAS Professional 5.0 has added an integrated memory manager, mouse support, serial port communications and graphics capabilities.

The product includes a screen painter, program generator, source code editor, report writer, import/export routines and a data dictionary maintenance program. TAS Professional 5.0 uses the Btrieve database file manager as its file handler. It comes file ready and can be run in single or multiuser mode.

TAS Professional 5.0 costs $599.

▶ *Business Tools*
(919) 932-3068

Allen Communication, Inc. has announced Quest 5.0, a multimedia authoring system for Windows.

According to the Salt Lake City company, Quest 5.0 lets developers assemble graphics, text, audio, video motion, buttons and animations or set up branching and interactions.

Users can develop at the design level for overall structure and interactions or at the frame level to see exactly what the end user will see. Live objects let users modify object properties during both development and runtime.

A FastTracks feature lets users add their own context to prebuilt layouts, templates and menus, and a Dynamic Librarian lets users manage all data types in one library.

Quest 5.0 costs $3,995.

▶ *Allen Communications*
(801) 537-7800

Objectshare Systems, Inc. has announced WindowBuilder Pro for IBM Smalltalk and VisualAge, a user interface builder.

According to the San Jose, Calif., company, WindowBuilder Pro lets programmers build applications without in-depth knowledge of the underlying Motif windowing system in Smalltalk.

Editors are included for native widgets and generic controls. A callback editor integrates the window into the application; an attachment editor helps specify what happens when a window is resized; and a properties and templates editor provides customization for code generation and other editors.

Controls built with the product can be combined into higher-level controls such as spreadsheets and business graphics.

WindowBuilder Pro costs $495.

▶ *Objectshare Systems*
(408) 727-3742

Lexicus Corp. has announced Lexicus Longhand, handwriting recognition software for developing cursive writing-based applications for the Windows for Pen Computing operating system.

According to the Palo Alto, Calif., company, Lexicus Longhand recognizes and corrects natural handwriting.

A 25,000-word customizable dictionary immediately corrects errors, anticipates common user words and recognizes proper nouns. The product has a recognition speed of 12 characters per second.

Lexicus Longhand costs $149.

▶ *Lexicus*
(415) 462-6800

Revelation Technologies, Inc. has announced OpenInsight 2.5, a repository-based development environment for programmers of Windows applications on LANs.

According to the Stamford, Conn., company, OpenInsight 2.5 provides a mirrored repository that lets systems administrators apply a mirror to the main repository table so the system can recover from a fatal repository file corruption.

A report designer lets users modify reports and access OpenInsight data without programming.

OpenInsight 2.5 costs $895 per developer.

▶ *Revelation Technologies*
(203) 973-1000

Soffront Software, Inc. has announced Track for Windows 2.0, bugtracking software.

According to the Milpitas, Calif., company, Track for Windows 2.0 uses a customizable database to define bugs and inform users of new bugs and the status of bugfixes.

The product includes a query mechanism, text and graphic report formats, a change history, automatic notification, multiuser access, security and import/export capabilities. Track for Windows 2.0 is based on a query-by-example model that lets users enter a query by filling out the same familiar form used to record the defective data.

Track for Windows 2.0 costs $495.

▶ *Soffront Software*
(408) 263-2703

Visual Basic

CONTINUED FROM PAGE 63

nancial software developer in Waltham, Mass. The company is using Visual Basic as one of its main development environments, he said.

"The problem with Visual Basic add-ons or components is that lots of mom-and-pop operations are doing them, and sometimes components from very small companies can be flaky or low quality," Kalin said. "Those who want to use components are faced with the problem of how to sort out the garbage from the good stuff. Progress can invest quite heavily to become a one-stop shop for Visual Basic add-ons."

He added, "The industry as a whole has not given enough attention to Visual Basic as a true development language. Visual Basic has great potential."

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Unlikely Allies

[IS is shedding its traditional image of HR, say Georgia-Pacific's Gwen Barker and Rick Partridge]

By Julia King

In the past, IS has viewed human resources more as a hindrance than a help. But that image is changing as IS managers become dependent on HR to help retrain and motivate distressed and distrustful staffs.

Information systems are only as good as the people who build them. And lately, the people who build them have had a lot more on their minds than computers.

Corporate downsizing, ongoing business process re-engineering and frequent organizational restructuring are wreaking havoc with IS morale, which at many companies is at an all-time low. Changing technologies, the move to client/server and closer workings with business users are requiring new skill sets. Project demands are high, but worker motivation is low. Job security is all but nonexistent. In many cases, so is trust in IS management.

IS managers are finding that to turn this picture around, they themselves must do an about-face. And they are tapping an unlikely source for help — the corporate human resources organization.

The traditional IS image of HR as a legion of well-meaning but essentially useless bureaucrats seems to be fading. In its place is a growing dependence on HR to help with restructuring and retraining IS staffs and finding new ways to motivate employees and keep them happy and productive.

These HR/IS efforts aim to meet the needs of both individual staff members and the organization. Such efforts include the following:

- Providing one-on-one counseling sessions with IS staffers about their retraining needs and strategies;
- Developing compensation and reward systems and devising more appropriate ways to measure individual performance on teams;
- Establishing training programs to accommodate the transition from centralized to distributed computing.

This contrasts sharply with the picture common just a few years ago, when many IS managers viewed HR as clueless about day-to-day IS operations. On the whole, an us-vs.-them attitude prevailed.

"Traditionally, the IS mind-set has been that human resources is good for policy but doesn't

Unlikely allies, *page 70*

Unlikely Allies

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really help in meaningful ways," says Gwen Barker, a 20-year IS veteran now an IS human resources consultant at Georgia-Pacific Corp. in Atlanta. "HR is typically viewed as a bureaucratic staff function that creates procedures and then leaves interpretation and implementation up to the operating units."

Gradually, traditional HR organizations are beginning to change, experts say.

"Some companies are waking up to the need for HR to redefine its role," says Charles Savage, president of Knowledge Era Enterprises, Inc., a management consultancy in Wellesley, Mass. Increasingly, HR, like IS, is being integrated into the rest of the business, he says. For instance, several companies have appointed HR liaisons to work with IS departments; others have set up entire HR groups with IS to work exclusively on IS personnel issues.

Georgia-Pacific, Chevron Information Technology Co. in San Ramon, Calif., and Rochester, N.Y.-based Xerox Corp. — long regarded as a corporate organizational innovator — have set up such groups.

General Electric Co. in Fairfield, Conn., and Fireman's Fund Insurance Co. in Novato, Calif., have appointed liaisons from corporate HR departments to work exclusively with decentralized IS professionals.

Thanks to the liaison setup, "it's been a long time since we've been involved in that we-vs.-them attitude toward HR," says Virgil Pittman, Fireman's chief information officer.

That attitude is shared by Steven Edmonson, director of business systems development at the Engineered Materials Division of AlliedSignal, Inc. in Morristown, N.J., which has been in the process of re-engineering since 1992. "We would not have been as successful as we have in the past two years without our HR person," Edmonson says.

Among other things, Edmonson credits the HR liaison with quelling much of the fear and anxiety that accompanies change.

"This person has a background in psychology and was able to understand a lot more about people than we [in IS] could," he notes. "She was willing to spend time with IS people in stressful situations and help work through things, whether they had been displaced or if they were trying to make a decision about reskilling."

The liaison also helped set up award and recognition programs for IS staffers, something Edmonson says has worked to better focus IS on business issues and to boost morale.

"If a person has done something outstanding that impacts the business, they might receive a monetary award. If a person was recognized by a customer but there was no significant impact on the business, there's a different level of reward," Edmonson says. "HR has helped IS to understand the level of reward that is appropriate."

As companies adopt new client/server, object-oriented and other technologies, retraining IS personnel has become a primary challenge for both HR and IS.

To this end, an increasing number of HR and IS managers are working together to set up competency review programs to determine precisely those areas in which IS staffers may need additional skills or training.

"Three years ago we had a difficult time even putting this topic on [our annual conference] agenda," notes Roger Sukkowiac, a partner at People Software Concepts, an IS management and human resources consultancy in New Haven, Conn. But now, he says, about 50 large companies he works with have already implemented or are building competency models to ensure that IS organizations continue to develop their skills around business needs. This can also be good news for IS staffers, who through competency testing and retraining programs are afforded opportunities to keep up their skills and thus increase their employability.

At GE, a large part of the IS training effort is focused on "facilitation, communications and presentation skills," all of which are critical to technical personnel as they are reorganized into business units, said Ron Hancock, manager of human resources and professional development for some 4,500 IS workers dispersed across more than 30 business units.

"I don't like to refer to them as 'soft skills' because some people devalue that," Hancock says. "What we're talking about is the ability to sell your ideas and understand people's positions. The days of IS being technically immersed instead of understanding the total business are pretty much past."

> "There's not a very good relationship between most IS functions and HR. IS people come from a hard-nosed, logical, systematic base of thinking. IS people think HR people come from a softer background. That's kind of a bad starting place."
>
> Jim Webber, President, Omnicom Center for Information Technology Management

Taken together, the various personnel challenges now facing IS are too much for a technology organization to handle on its own, according to Susan Ulicny, director of corporate systems at Georgia-Pacific. HR support is imperative, she says.

"I couldn't exist without them," Ulicny says of Barker and the other HR staffers who work in the IS organization at Georgia-Pacific. "They are an integral part of our staff." To oversee this new relationship, the company last month appointed its first group manager for information resources/human resources, Rick Partridge.

Among other things, the HR staffers in IS have developed a list of core skills needed in the IS organization and a method for measuring performance against them. This, Ulicny says, has enabled IS to more accurately identify where there are gaps and to tailor training programs accordingly.

Security vs. employability

At Chevron, HR staffers are credited with enabling IS managers to implement an altogether new concept of employability.

"One of the biggest issues we face from a morale standpoint is the lack of job security, and in the past couple of years job security has become a high-priority item for IS employees," says Rose Taylor, general manager of planning and architecture.

With the help of HR, Taylor says, IS employees have training opportunities that allow them to keep their skills current.

Now, for instance, even though Chevron is moving from a mainframe-centric environment to a client/server one, "we still need a lot of mainframe people to maintain legacy systems," Taylor says. As a result, the company can't assign all IS staffers to highly prized client/server projects. "But what we can do is provide educational opportunities [in the form of outside classes or in-house training] so that they'll know those skills ahead of when they are needed," she says.

Another HR initiative at Chevron that has helped dispel job insecurity is a self-nominating process for open IS positions. Under this system, employees recommend themselves for open positions. Final decisions are made by a selection committee whose members are known to the staff.

Previously, "the process wasn't as formalized," Taylor says. "A job would come up, we'd let the supervisor know, and the supervisor would let the employees know." That was the extent of employee involvement, she says.

Now, "there's not this vision that something is happening behind closed doors," Taylor says. "Employees have a good understanding of how a job was filled."

Top 12 Human Resource Issues Facing IS Organizations

1. Acquiring a stronger business orientation
2. Encouraging managers to be business-focused
3. Defining skill requirements for the future
4. Emphasizing creativity and innovation
5. Developing a strategy to transfer certain IS functions to users
6. Retraining personnel
7. Providing training in communication and behavioral skills
8. Finding new ways to motivate individual workers
9. Implementing effective change programs
10. Developing better measures of performance
11. Aligning IS organizational structure with IS strategy
12. Developing career path options for technical personnel

Source: 1994 survey of 200 IS human resources managers, Zawacki and Associates, Colorado Springs

Overall, Taylor likens the role of the HR professional in this process to that of a counselor who coaches IS staffers about their training needs and choices.

Joan Bardez, Chevron's HR manager, views the HR role much the same way. In the absence of job security, "the whole issue of what employees want from a company and what a company's responsibilities are are big issues," Bardez says. "We're trying to move toward a philosophy that we'll do as much as possible to help employees remain employable here or elsewhere."

Eyes on the prize

At Xerox, which last year outsourced all of the legacy systems to Electronic Data Systems Corp., a key goal of the IS-based recruitment department is to recruit top IS talent to work on state-of-the-art object-oriented systems.

Another goal for that 10-person group, according to Bob Monastero, director of global processes and information management, is "to build a worldwide repository of skills" by training Xerox IS staffers in object-oriented and client/server technologies.

To meet the first goal, the company has established object-oriented technology centers in California, Massachusetts and New York, with a fourth location planned. By giving recruits a choice of geographic locations, Xerox hopes to attract the best and brightest object-oriented professionals, Monastero explained.

Xerox has also begun offering up to 12 days of training annually to the 750 IS employees it retained after outsourcing its legacy systems to EDS. Most staffers, Monastero says, will spend seven or eight days in classes, at an average cost of $10,000 per person. Such training, he notes, improves workers' employability at Xerox and elsewhere.

This is one of the reasons, Monastero says, that Xerox is also interested in developing innovative evaluation and remuneration programs, such as performance-based pay scales. The company views such programs as a way to motivate and retain IS staffers in which it invests, Monastero says.

"One of the risks for us in being at the leading edge is losing people because they change jobs more rapidly," he notes. "If I'm going to make a significant investment in a person, I need to retain them for five years."

Among the incentives he is developing is a retention bonus, separate from other Xerox vesting programs, that would be payable after the employee had worked at the company for five years.

New flexibility

At Georgia-Pacific, Barker says one way to increase retention is by giving staff job flexibility. "The work/family situation is much more important to people than before," she notes. "Just giving a person a PC at home or a pager helps with this immensely."

Suhkowiac says "different companies are ahead in different areas" when it comes to innovative means of recruiting, retraining and retaining IS personnel. Still, he sees a very definite trend emerging: "We've gone from HR support that has been somewhat tentative [in IS] to the point where it is absolutely critical." ■

King is a *Computerworld* senior editor, management.

Seeds Of Satisfaction

Partnerships between IS and HR are resulting in a variety of programs and practices, such as the following:

AlliedSignal, Inc.'s Eng. Materials Div. Morristown, N.J.	• Individual job skills counseling • New reward and recognition progams
Xerox Corp. Rochester, N.Y.	• Performance-based pay programs
Georgia-Pacific Corp. Atlanta	• Standardized IS job descriptions and performance measurement criteria • IS staff competency reviews and customized retraining programs
General Electric Co. Fairfield, Conn.	• IS staff training in communication and negotiation skills
Chevron Information Technology Co. San Ramon, Calif.	• Self-nomination of IS employees for vacant positions • IS employee training in new technologies

Intelligence Files

Bank IS spending to grow

Although U.S. bank information and communications technology spending is expected to grow 1.5% annually beyond the $20.1 billion spent in 1994, investments in branch automation actually declined in the past year. That's due to a number of factors, according to "Operating Budgets and Capital Investments for Information & Communications Technology in Banking," a report newly issued by Mentis Corp. in Salisbury, Md.

Investments in branch automation hardware declined from $495 million in 1993 to $454 million in 1994, due in part to an industrywide realization of how complex it is to implement distributed client/server architectures across a banking enterprise, according to Mentis.

Stay home, please!

IS managers are feeling more and more that the best way to increase employees' productivity is to tell them to just stay home. That is the finding of a recent survey by the Olsten Forum for Information Management, a division of the Olsten Corp. in Melville, N.Y. Olsten polled 1,022 corporate, human resources and IS managers on telecommuting.

According to the survey, nearly a third of U.S. companies are encouraging workers to telecommute because they expect this will increase the employee's productivity. An average of 9% of staff telecommute at companies that encourage it; the majority of those employees have delivered on the productivity promise.

Telecommuting is most strongly encouraged at high-technology companies (44%), followed by firms in the services sector (37%), banking/finance (34%), retail/wholesale (33%), insurance (32%), manufacturing (27%), utilities and transportation (22%), health care (20%) and public nonprofit agencies (16%). The study also found that at companies that offer telecommuting, 63% allow it for professional employees, 37% for sales/marketing staff, 30% for financial/accounting staff and 23% for data-entry clerks.

No place like work

While managers would like to see more of their employees work at home, many employees still feel the best place to be on the job is at the workplace.

In a survey by CDB Research & Consulting, inc., employees from a cross section of industries said they are skeptical about being able to do their jobs as well from home. They cited a lack of equipment, supplies and information access.

Employees also cited a variety of expected advantages of telecommuting, most of them personal in nature. Topping that list were flexibility (57%), setting their own hours (48%), reduced stress (33%), eliminating commuting time (30%) and ability to get more work done (20%). Male respondents favored not having to commute more than female respondents, while female respondents gave a higher rating than men to saving on the cost of child care.

Larry Chiagouris, managing director of CDB Research & Consulting, said, "While we already have the technology to access information from home, through telephone, fax and electronic mail, there appears to be a perceptual gap regarding what these technologies can do."

POSPP gets new name

Mercifully, the 20-year-old Profit-Oriented Systems Planning Program (POSPP), an IS professional association of 70 large companies, has changed its name. Henceforth, the Atlanta-based group will go by the name The Information Management Forum. "It got so we didn't know what POSPP meant anymore, nor did anyone else," said Paul Burdick, an executive at the organization.

ISer is bombing suspect

Edward Leary, 49, an unemployed computer technician, was the prime suspect in the Dec. 21, 1994, bombing of a New York subway car, in which more than 40 persons were injured. Police said Leary, who was fired in January 1994 by Merrill Lynch & Co., was suspected of igniting a mayonnaise jar full of a flammable liquid on a subway car in lower Manhattan. Leary, who suffered burns over 85% of his body, was also being questioned about a similar incident that occurred the week before in which a teenage girl's backpack caught fire on a subway in Harlem.

Customer efforts hailed

Unisys Corp. has honored Signet Banking Corp. in Richmond, Va., with its 1994 Customerize Award for Excellence. The award, which the Blue Bell, Pa., computer maker gives in tribute to customers who support their own clients with "outstanding service programs," recognizes Signet's development of innovative customer service programs.

Call me 439864266

Americans are apparently losing their numbers anxiety when it comes to identification. The latest poll, published Dec.12, 1994, shows that 60% of Americans support the use of a national ID system to curb the hiring of illegal aliens as proposed by a federal commission on immigration reform [CW, Aug. 8, 1994].

The poll, conducted by Louis Harris and Associates, Inc. for Atlanta-based Equifax, Inc., found that whites generally support the plan. Opponents include blacks, people who say they distrust the government and people whose Social Security numbers have been misused.

College earns IS laurels

Cap Gemini America has awarded its first Excellence in Education award to Loyola College in Maryland. The award recognizes the dual focus of Loyola's IS department on business and technology.

BUSINESS, SCHMIZNESS! Give me computers!

Madame X

We've heard it over and over: "Be less of a technician and more of a businessperson."

We read about it in magazines and hear endless entreaties at conferences. Although certainly a noble goal, it's one that most computer professionals won't pursue. Why? Because the time and energy it takes to acquire a high level of business skills takes us from our prime love, computers. And those of us who have made computing our profession do it for a simple truth that all of us will privately acknowledge but few will dare say: Mr./Ms. Business Colleague, we like computers better than we like you.

We like computing because technology is fun. It's stimulating to try different things and see what happens. And, unlike in most social endeavors, we get immediate gratification. In most other professions you have to wait for results: Salespeople and accountants wait for month-end statistics; executives wait for quarterly results; most managers wait for months or years to know the success of their endeavors. We don't. If a machine is down, we know instantly when it's back up; if we're coding, a compile and a run will tell us if something went wrong.

Most human fun has unpleasant consequences; that's not so with computers. We like computing because machines don't complain. Computers have their problems, but they sit patiently waiting to be fixed. They don't call your boss if it's taking you a while to find a solution. They don't write memos about your poor performance. They don't remind you how often this has happened in the past. They don't blame others for their own mistakes. And they don't make comments like, "I know that's what I said I wanted, but this is what I really need."

Perpetual evolution

How often have you heard, "The computer made a mistake"? Well, we know who's really at fault, don't we? At least if the computer indicates "operator error," it's usually telling the truth. We like computing because there's always something new to learn. We read business magazines because we're obliged to; we read computer magazines for the thrill. We like to see what new and different things have come to the marketplace, things usually created by people just like us trying to solve a problem.

Of course, other fields experience innovation. But most business disciplines deal with people problems, not technical problems. And when it comes to "people problems," there is nothing new under the sun. It's the same old jockeying for power, chasing the buck and dealing with egos that it's always been. In computing, there truly are new problems and new solutions.

We like computing because it brings order and structure. Unlike the real world, which closely resembles chaos most of the time, computing has a fundamental logic that is appealing. It deals with black/white realities: on/off, yes/no, if/then/else. We can break both hardware and software down to their component parts and reassemble them into newer, better shapes. Ask any kid who ever played with Lincoln Logs or an Erector set and you'll know what I mean.

There are rules, but it is creativity within the overall structure that is so exciting. And sometimes you get to break all the rules and have a true breakthrough.

We like computing because technology makes life better. Computers have removed much of the tedium from life and have certainly been the basis for innumerable advances in medicine, energy, learning and production. Work is more interesting, safer and more egalitarian in many ways because of computers.

Most computer professionals truly believe they have a beneficent craft, capable of advancing human endeavors. That's not to say technology can't be turned to evil purposes — witness stealth bombers, money laundering or pederasts prowling the Internet. In the grand scheme of things, however, the overall effect is one of "better living through technology." And we all contribute to that.

We like computing because it makes us mobile. How many people hate their jobs? How often do you hear computer professionals say that? We have very high job-satisfaction levels because our work is varied. We move from project to project, company to company, industry to industry. We are not tied down to the fortunes of any particular division, firm or market sector. Until you get to the very highest levels in computing, where you've worked is far less important than what you've worked on; it's your experience with appropriate technologies that counts. In this turbulent economy, it is the ultimate job security.

> Unlike the real world, which closely resembles chaos most of the time, computing has a fundamental logic that is appealing.

A breed apart

We like computing because it makes us feel special. There is a mystique about computing in the minds of the general public that says you have to be both skilled and smart to work with computers. They know we earn good money, usually more than our contemporaries (given equivalent levels of education and experience). Many companies even have to have separate pay scales for computing folks and the rest of the company. Because of our mobility, we are relatively immune to layoffs and other stresses of modern corporate life. We are part of an elite, and even if businesspeople don't like us, they still need us. We like computing because it is safe. Consider this personal ad: *Wanted: Intelligent, attractive companion who has both playful and serious sides, capable of learning new skills, patient, fun, nonjudgmental, mobile, no bad habits or dependents.*

A few dogs might fit the bill but few humans; almost all PCs would. Computers let us explore encyclopedias of knowledge, engage in far-flung conversations with people we might otherwise never meet and investigate whole new worlds of experience — safely, cheaply and from the comfort of our own home. The rest of the world is now discovering what we have always known, that machines are generally a lot easier to live with than our fellow human beings.

So, businessperson, next time you wonder why we cling so to our discipline, resist working for nontechnologists and feel most comfortable in front of a screen rather than in meetings with you, understand that we really are different and want to stay that way. And yes, if we're smart and ambitious, we'll learn about your business and master your language. But it will always be a second language. The mother tongue is still technology. ■

The author is an IS executive. This column had to be submitted anonymously because people, unlike computers, take offense at the truth.

Calendar

FEB. 26-MARCH 4

SAC '95: 1995 Symposium on Applied Computing. Nashville, Feb. 26-28 — Contact: Jim Rightower, Association for Computing Machinery, Claremont, Calif. (909) 624-8902.

The PC Nightmare Symposium. Orlando, Fla., Feb. 27-March 1 — Topics include upgrades and alterations, disposition, obsolescence, maintaining standardization and assessing costs. Contact: International Computer Negotiations, Inc., Winter Park, Fla. (407) 740-0700.

Effective Methods to Manage and Control a Work Process. Orlando, Fla., Feb. 27-March 2 — Contact: Quality Assurance Institute, Orlando, Fla. (407) 363-1111.

Engineering Document Management Systems Focus '95. Orlando, Fla., Feb. 27-March 2 — Contact: Kalthoff Group, Cincinnati, Ohio (513) 794-3367.

Bringing the Power of Teamnets to Your Work. Cambridge, Mass., Feb. 28-March 1 — An interactive workshop led by Jessica Lipnack and Jeffrey Stamps, authors of *The Age of the Network* and *The TeamNet Factor*. Contact: The Networking Institute, Inc., West Newton, Mass. (617) 965-3340.

Marketing on the Internet: An Intensive Briefing on the Keys to Success and the Roads to Ruin. Boston, March 2-3; New York, March 6-7, and Washington, March 9-10 — Fees: Day 1, "The Technology," $495; Day 2, "The Strategy," $695. Contact: Target Marketing of Santa Barbara, Hayward, Calif. (800) 549-4650.

Workflow: Joining the Islands of Automation. Chicago, March 2-3 — Early registration fee is $1,095, regular registration fee is $1,200. Contact: Delphi Consulting Group, Boston, Mass. (617) 247-1025.

MARCH 5-11

The Sixth Annual Expanded International Help Desk Conference. San Francisco, March 5-8 — Seven conference forums examine key issues, including planning, implementing and supporting a help desk or related support service. Contact: Help Desk Institute, Colorado Springs, Colo. (719) 531-5138.

The Workgroup Solutions Conference and Expo. Boston, March 5-8 — A guided tour of groupware, including improved electronic meeting facilitation techniques; maximizing return on investment, global collaboration, groupware for heterogeneous architectures; automating field personnel; developing workflow applications; integrating groupware with legacy systems; and administration and security issues. Contact: David Coleman, GroupWare '95, San Francisco, Calif. (415) 282-9192.

Convex User Group Worldwide Conference. Dallas, March 5-9 — Contact: Mary Kay Havens, Convex Computer Corp., Richardson, Texas (214) 497-4584.

Information Security Managers Symposium XIV. San Diego, March 7-8 — Contact: MIS Training Institute, Framingham, Mass. (508) 879-7999.

MARCH 12-18

15th Annual Use of Clinical Information Systems Conference. Snowbird, Utah, March 12-15 — Contact: Association for Applied Clinical Information Systems, Ann Arbor, Mich. (313) 971-6557.

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The Apple Enterprise Awards is a global competition designed to honor developers of innovative custom solutions that best employ Apple® technologies. Your submission will be judged on how you've delivered an effective custom solution in your organization.

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City of Palo Alto saved from urban blight.

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HP SureStore Optical Jukebox gets 48 cabinets of files onto the network and off the floor.

It was not a pretty sight. More than 900 square feet of office space, buried in paper documents. Police records. Building inspection reports. Tens of thousands of files. And with the growing demand for information—and the mounting costs of finding misplaced records—a bad situation was fast becoming a crisis.

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Hewlett-Packard had the long-range solution the city desperately needed. An optical jukebox that could safely store every last file onto the network. Since HP optical disks have a 30-year shelf life, the city's records would last far longer than they ever could on paper. And there'd be no danger of running out of storage space. HP optical disks can be removed and swapped—so storage capacity is virtually limitless.

Today archived documents that took city workers days to unearth can now be accessed with a simple touch of a key. And the savings are substantial. Between increased productivity and reduced overtime, the City of Palo Alto figures their HP SureStore Optical Jukebox saves them about $26,000 annually. And frees up $31,000 worth of rented office space to boot.

Are burgeoning archives a blight on *your* operations? HP has the proven solution. For more information, call **1-800-826-4111, extension 9106.**

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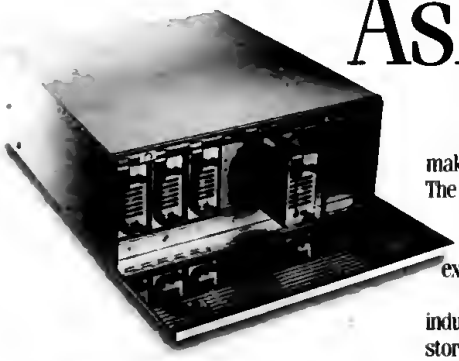


"...most impressed by the SuperFlex's performance, expandability, and myriad configuration possibilities."

"Storage Dimensions' RAID subsystem outperforms Compaq Smart Array."

"...SuperFlex offers investment protection that should help [CFOs] rest easier."

"Hardware vendors focus little on making their products backward-compatible. The result: Chief financial officers wind up amortizing equipment over five years, even though it's likely rendered extinct in two."

That's how PC Week described the industry in an October 17, 1994 article on storage products. It found one bright spot, however: SuperFlex™ from Storage Dimensions.

Bucking the trend.

After an in-depth review, PC Week concluded that the SuperFlex RAID system "bucks the trend toward accelerated obsolescence." The review specifically praised SuperFlex for its investment protection through:

- Modular design to incorporate future technologies
- Simple field configurability and upgradability
- Easy expandability for growing requirements
- Backward (and forward) compatibility of hardware

Superior performance.

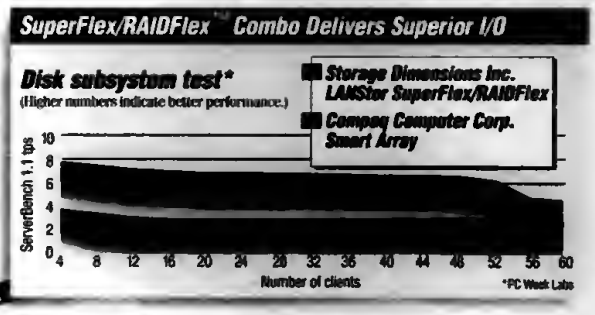
What about performance? PC Week Labs benchmarked SuperFlex and Compaq's Smart Array. The result? In I/Os processed, SuperFlex outperformed Smart Array 2 to 1.

SuperFlex uses high-performance, high-reliability Barracuda drives from Seagate.

Non-stop operation.

PC Week also praised the high reliability of the SuperFlex design. With hot-swappable, redundant power supplies, triple fans, on-line spares, and a sophisticated cableless backplane, SuperFlex truly is the "RAID unit designed for the long haul."

To get the complete story, call us. We'll send you a reprint of the article along with more information about SuperFlex – the innovative, Enterprise Storage Platform.™ Let us help you *buck the trend!*



PCWEEK

PC WEEK/NETWEEK

Reprinted from October 17, 1994

RAID unit designed for long haul

LAB NOTE SuperFlex system preserves investment

By William F. Hurley

The computer industry continually rushes toward tomorrow's great technological advance, leaving a wake strewn with yesterday's hardware. Yet unlike operating-system developers, hardware vendors focus little on making their products backward-compatible.

The result: Chief financial officers wind up amortizing equipment over five years, even though it's likely rendered

should help the bean counters rest easier. Although it is certainly not the least expensive RAID on the market, we were nonetheless most impressed by the SuperFlex's performance, expandability, and myriad configuration possibilities.

First shipped last month, the LANStor SuperFlex chassis can house seven 3.5-inch drives that connect to the actively terminated SCSI backplane. The price for a complete seven-drive, 126-byte system with EISA or PCI host adapter is $20,440. The system that PC Week Labs tested included Storage Dimensions' $2,465 RAIDFlex I/O module, which is based on a Mylex Corp. DAC960 controller.

Storage Dimensions sells an empty SuperFlex cabinet for $3,125. Both Fast SCSI and Fast/Wide SCSI drives are available. Prices range from $1,470 for a 4G-byte drive to $4,900 for the high-end 6G-byte drive to $4,900 for the high-end DDS-2 digital audiotape drives are available.

PERFORMANCE

In ServerBench 1.1 tests, PC Week Labs found the SuperFlex/RAIDFlex combination delivered excellent I/O performance (see benchmark chart, right). We expected this because the RAIDFlex's Mylex-based controller has shown its mettle in previous PC Week

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The CW Guide to RAID Storage Devices

RAID *goes* RADICAL

INSIDE

page 78 **LET'S MAKE A DEAL:** Users talks about the priorities (and discounting) that led them to purchase one of the Top 3 large system RAID storage products.

pages 80, 82 **BATTLE ENGAGED:** Now that StorageTek and IBM have entered the fray, EMC has a new fight on its hands. Buyers' Satisfaction Scorecard and Firing Line evaluators provide some hype-free analysis from the trenches.

page 83 **MIDRANGE MADNESS:** Even the staid AS/400 and other midrange arenas are going wild over RAID. But it's taking an open systems twist.

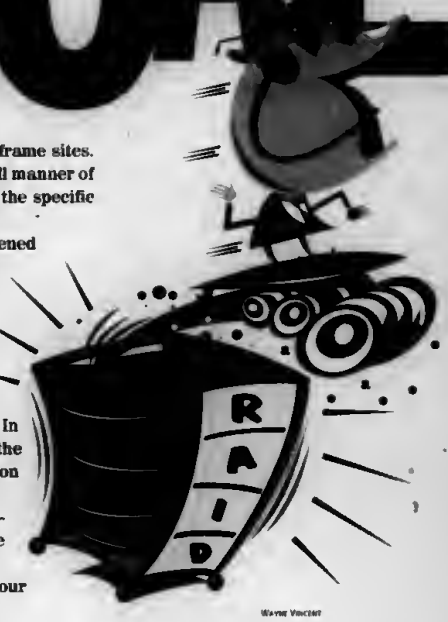
The growing popularity of RAID is turning the storage market upside down — even for mainframe sites. Traditional direct-access storage device (DASD) farms, where general-purpose devices meet all manner of requirements, are giving way to RAID systems with unique architectures designed to match the specific data-access and storage needs of each site.

Three major vendors are jockeying for position in this new data-driven world. EMC Corp. opened the RAID market with its Symmetrix systems, which use large amounts of cache and software systems to boost performance. The company has taken more than a little business away from IBM, which once owned the DASD market. EMC has also grown at the expense of Storage Technology Corp., which has dragged its feet in delivering its own RAID technology.

Now, IBM's Ramac and StorageTek's Iceberg are being delivered to mainframe sites. These products are creating more choices for information systems managers and reshaping the storage landscape. In this report, Robert Callery, an analyst at International Data Corp. (IDC) in Framingham, Mass., describes how the changes affect your buying decisions. Users of each of the three products explain what led them to choose a particular product. Our Buyers' Satisfaction Scorecard and Firing Line spotlight the views of 119 storage users at large mainframe sites.

This Guide also looks at the midrange storage market, which is rapidly evolving from a proprietary model to an open systems, RAID-heavy structure. Lab tests highlight the challengers in the IBM AS/400 arena, and a roundup chart lists the leading products across the board.

Take note of the radical remaking of this segment of the computer business. It will make your choices for storage harder but provide solutions that better fit your site's unique requirements.



Wayne Vincent

BUYING ISSUES

In the RAID world, products are built to fit the data. In the past, IBM offered one-size DASD for all needs.

By Robert Callery

Like a tidal wave of change, RAID is sweeping over the large systems storage marketplace and brushing IBM's traditional DASD dominance aside in the process.

In a few short years, Hopkinton, Mass.-based EMC has risen from the fringe of the data center to become IBM's leading challenger for market share. It has done so on the strength of its RAID-like approach to DASD, offering high performance and availability at an affordable price.

Last year, IBM finally answered the challenge with its own RAID system, known as Ramac. StorageTek in Louisville, Colo., also finally delivered its long-delayed Iceberg RAID device.

IBM's and StorageTek's systems offer complete RAID compliance, including Level 1 through Level 5. (See RAID definitions at left.) EMC's Symmetrix line, although identified in the RAID category, currently offers only a disk mirroring option as its main RAID component.

These new devices provide dramatically improved performance, reliability and functionality over IBM's traditional DASD. They also provide a radical change in the way storage devices are designed and purchased.

Always charged with keeping corporate data safe, available and quickly accessible, IS managers had a much simpler decision to make as little as three years ago. The only significant issue was determining which vendor to do business with. All suppliers offered similar technology. Some subsystems offered better environmentals and performance, but user alternatives were somewhat limited.

But today RAID suppliers are building storage strategies around completely different architectures and designs and are attempting to solve I/O problems with a variety of approaches.

Data first

A short while ago, vendors offered a "one-subsystem-fits-all" solution to businesses. IBM, just one disk generation ago, provided users with a generic family of storage products, the 3390-3 series, which offered one basic level of performance, capacity and fault tolerance in the mainframe environment.

New entrants in the market, such as EMC and StorageTek, began to offer storage solutions revolving around customer data requirements. With IBM following suit, this led to a Copernican revolution in the storage world. However, the focus is now shifting to the data itself instead of on the subsystem that stores data. The characteristics of the data largely dictate the type of disk hardware required

AT PRESS TIME

EMC confirmed last week that it plans to deliver RAID-S, a new version of its Symmetrix line in the third quarter. RAID-S will feature RAID 4-plus capabilities. The typical configuration for the system will feature three data disks to one parity disk, with up to 128 disks supported in total. The RAID-S logic will be embedded in a new chip in the Head Disk Assembly. The product will also support multiple RAID levels and data formats in a single system, sources said. See related story in news.

The EMC product will be delivered in the same time frame as HDS's first RAID 5 offering. HDS will reveal its plans on Feb. 7. StorageTek is also expected to discuss its next RAID product, called Kodiak, in a Feb. 7 announcement.

RAID DEFINED:

RAID stands for redundant array of independent disks. In the mainframe environment, it represents a set of physical disk drives that the operating system views as a single logical drive with data distributed across it. Redundant disk capacity is used to store parity information to guarantee data recoverability in case of a disk failure. RAID was developed and patented by IBM in the mid-1970s.

RAID is divided into five levels. The three most common are:

RAID 1: Data mirroring
- This provides complete fault tolerance. Data can be recovered if a disk fails because two copies are kept.
- The disadvantage is that only half the available space is used for data storage; the rest is for backup. This doubles the cost per megabyte.

RAID 3: Data striping
- This involves spreading the data across multiple disks in the array, with one used for parity.
- The main advantage is fault tolerance. The data can be recovered if any disk fails. Performance is excellent because there is a high transfer rate for large sequential files.
- While strong in fault tolerance, this level has a disadvantage — if more than one drive fails, you're in trouble.

RAID 5: Data striping plus
- Data and parity are spread across multiple disks in the array.
- Fault tolerance is strong as well as performance.
- Unlike RAID 3, distributed parity decreases the risk of lost data from a single drive failure, but it increases performance penalties for write functions.

Source: International Data Corp., Framingham, Mass.

Why I bought this RAID

By Ron Levine
Levine is a freelance writer in Carpinteria, Calif.

▶ MARKET PRESENCE, SIZE AND PERFORMANCE

USER PROFILE

When TDS Computing Services, Inc. in Madison, Wis., decided to replace its 3380 storage devices with a new storage system, its dilemma wasn't which RAID system to choose but whether to go with RAID or IBM's 3390.

High capacity and high performance are the leading strengths of the Symmetrix 5500 series introduced in December 1992

"The economies of scale and performance pointed to RAID over traditional DASD," says Gary Annen, manager of technology integration services. "Our selection criteria included price, the length of time the vendor had been in the market, availability of software/hardware support and reliability."

TDS, which provides data processing support for the corporation's three main business units — United States Cellular, TDS Telecom and American Paging — opted for EMC's Symmetrix RAID Level 1 system. "We never considered other RAID units as we didn't need their capabilities," Annen says.

The RAID storage units are used for all TDS mainframe applications. RAID Level 1 — disk mirroring — performance provides the needed reliability at the best price. The company uses two Symmetrix 4800 Model 32s (90G bytes of storage and 1.2G bytes of cache), and one 5500 Model 9, running 9G-byte high-density disks (with a maximum capacity of 1T byte of cached disk storage).

Symmetrix's dynamic sparing and mirroring features have already proved to be effective, Annen says.

TURNED UPSIDE DOWN

and what type of storage device the data resides on.

With this different way of viewing data comes a new way of evaluating storage devices. The main technology choice users are making is between performance and fault tolerance. To date, no vendor has a legitimate claim as champion in both areas. (See Buyers' Satisfaction Scorecard and Firing Line, pages 80 and 82, respectively.)

In the short term, a mixed hardware/vendor strategy continues to he the most prudent one for storage acquisitions. Each vendor offers unique performance and reliability characteristics that satisfy data requirements.

Pricing advantage

By maintaining a multiple-vendor procuremeot plan, customers will continue to have maximum leverage to obtain the best possible pricing.

Another challenge for users will be determining whether they should buy new products from other veodors. Amdahl Corp. and Hitachi Data Systems Corp. are poised to hring high-performance, high-availability RAID 5 products to market in t995.

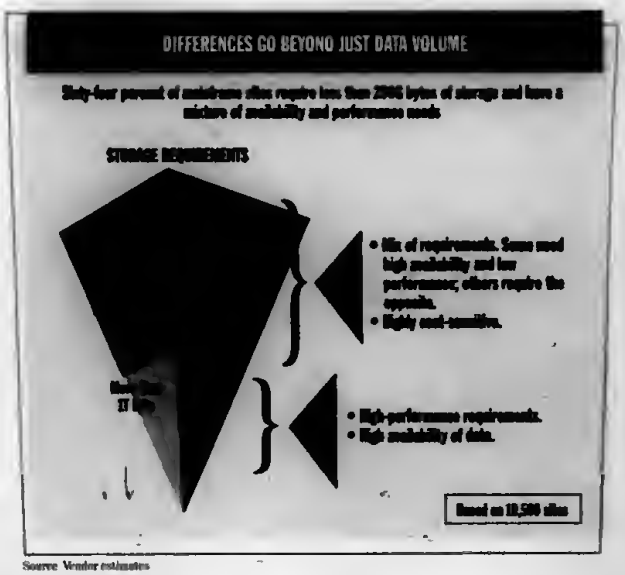
With both suppliers introducing prodncts hased on 3½-in. disks, there will be similarities in product characteristics such as redundant componentry like fans and power supplies and environmental savings like power and cooling requirements.

These will be dramatic improvements over the capabilities of existing products. While HDS hesitates to go public with details on its expected 1H95 storage announcement, IDC expects the company to introduce a RAID 5 snbsystem thal is based on 3½-in. disks and offers subsystem capacities close to tT byte of storage.

Alongwith its fauft-tolerant characteristics, IDC expects the HDS Scalable Server to offer hot pluggable disks and huilt-in hot sparing.

In the first half of t995, fDC expects Amdahl to announce a storage product that will operate in MVS and open Unix environments. The prodnct is codenamed Warp 9 and will offer multiple us-

Buying issues, *page 84*



Source: Vendor estimates

▶ AVAILABILITY, PERFORMANCE AND A GOOD DEAL

USER PROFILE

Availability, performance and price compelled Alamo Rent A Car, Inc. in Fort Lauderdale, Fla., to select StorageTek's Iceberg subsystem.

But the race was close, says Tom Loane, vice president of computer and communicatioos services at Alamo. IBM's Ramac and fceberg systems are similar in many aspects, Loane says. "It just happened that StorageTek had the best deal the week we went shopping."

Announced in January 1992, Iceberg finally began shipping last year. While it is designed to reduce RAID 5 performance penalties, Iceberg's key attributes are high capacity and high availability.

Loane also looked al EMC's Symmetrix. "EMC also has a good product, hut it does not perform in our eovironment. Our use is write-intensive, and we felt it was not right for os," he says.

Alamo considered traditional DASD before it selected the RAID system. But the economics were 100% on the RAID side; it's a lot cheaper than cooventional DASD, Loane says.

"Once you invest in the software to make RAID 5 work, the disks are cheap. ft's also nice to have a box that is an order of magnitude smaller than what it's replacing, thus saving floor space and requiring less air conditioo-ing," he says.

The Iceberg storage system at Alamo is configured for 200G bytes of storage with 512M hytes of memory.

▶ COMPATIBILITY AT THE RIGHT PRICE

USER PROFILE

Compatibility was PMI Food Equipment Group's No. 1 concern in its search for a RAID product last year.

"Whatever we purchased had to use our existing files without modificatioo, handle our database tasks, provide the response times we required, have high-availability and equal the present total capacity, plos give us some room to grow. Ramac fit the hill," says Ray Florence, director of PMI's Corporate Data Center in Troy, Ohio.

PMI, a manofacturer of restaurant food processing equipment, replaced two 3390 Model 3s, one 3390 Model 9 and an older 3380.

The firm wanted something that could use the existing controllers and the 3390 data structures as is and was compatible with its IBM ES/900 mainframe system. Cost was important, but compatibility was the main issne.

These requirements led PMI to choose IBM's RAID product, Ramac, last October. The installation went smoothly and without any problems, Florence says. "It's great to have just one little box sitting there humming, replacing a string of hig heavy ones," he says. "We looked at StorageTek's and EMC's offerings but were concerned about the controller issue and selected IBM. They gave us the best deal with compatibility and cost."

Announced in June 1994, Ramac finally gave IBM a foothold in the large system RAID market

The installed Ramac coofiguration is a 3392 Bt3 with 13 drawers. The system can he expanded to 16 drawers, with a capacity of 90 8G bytes of storage.

BUYERS' SATISFACTION SCORECARD: *RAID heavyweights duke it out*

BY KEVIN BURDEN

The Super Bowl may be over, but the battle for market dominance in high-end RAID still rages. Will the winner be first-to-market EMC Corp., with its established Symmetrix line? Or will it be the company no one dares call an underdog, Storage Technology Corp., with its long-awaited Iceberg?

And can IBM regain its dominance in data center storage with its newly delivered Ramac large systems RAID storage device?

According to International Data Corp. (IDC) in Framingham, Mass., EMC and IBM will each ship almost 34% of the total terabytes of mainframe storage this year, compared with just 10% for StorageTek. But most important, this market now has more than one contender.

Computerworld's user evaluations indicate that each product has an edge in certain areas. Symmetrix tops the performance ratings, while Iceberg and Ramac share the lead in reliability. A user analysis of Iceberg and Symmetrix follows. For the story on Ramac, see Firing Line (page 82).

Iceberg

The Iceberg 9200 Disk Array Subsystem has been the most anticipated storage product ever released. StorageTek did a lot to help build the hoopla by teasing the market, announcing one release date after another. However, as the product's user satisfaction scores show, Iceberg may have been worth the wait.

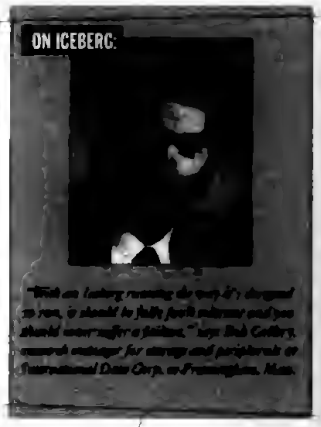
Iceberg's highest score was awarded for recovery from failures. It is a true RAID 5+ implementation, which means parity data is spread across all drives in the array, allowing Iceberg to take a hit on any two disks and still reconstruct the data.

Beyond RAID 5, Iceberg provides full fault tolerance at all levels of the system, including power, fans, cache memory, controllers and disk drives. "With an Iceberg running the way it's designed to run, it should be fully fault tolerant, and you should never suffer a failure," says Bob Callery, research manager for storage and peripherals at IDC.

Iceberg's major liability is its poor rating for ease of use. The system is very complex, says Paul Wolfstaetter, an analyst at Gartner Group, Inc. in Stamford, Conn. "You don't install an Iceberg unless you send your people to [StorageTek's] school in Colorado for a couple [of] weeks."

Iceberg's scaling flexibility helped it receive a high grade for capacity. Users can add 50G-byte upgrades to the 100G-byte base capacity, up to the full capacity of 400G bytes, before they need to purchase a new frame and controller.

Iceberg has also reduced the RAID 5 write penalty associated with locating and updating files in the same physical location. Iceberg employs a concept called the log-structured file system that rewrites the data in available free space elsewhere, then purges the old file.



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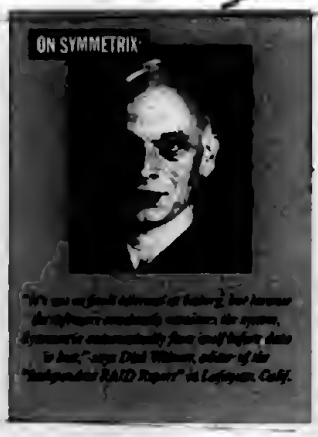

"It's not as fault tolerant as Iceberg, but because the software constantly monitors the system, Symmetrix automatically fixes itself before data is lost," says Dick Wilmot, editor of the "Independent RAID Report" in Lafayette, Calif.

While this reduces the write penalty, there is a potential trade-off in performance. As the in-use capacity of an Iceberg subsystem grows, its ability to quickly locate available space decreases, according to Callery. "When the [in-use] capacity gets up above 85%, the system spends too much time trying to collect free space, and that can affect its performance," he says.

Iceberg's speed, however, received favorable ratings, which indicates that users are either keeping the use below the 85% in-use threshold or carefully managing its capacity.

Part of what makes Iceberg different from its competition is its virtual direct-access storage devices (DASD). Conventional DASD requires spaces between written data so the read/write mechanism can work. Iceberg uses compression technology on the front end, which eliminates the need for gaps.

"The compressed data means that you get more data stored per gigabyte, and because you're sending compressed data down the channel, it can actually improve its performance," Callery explains.

Symmetrix

The Symmetrix series, while not considered true RAID technology, employs a mirroring technology similar to RAID 1 that creates a copy of all its stored data. But unlike Iceberg's fully fault-tolerant setup, Symmetrix depends on intelligent software to detect potential failures and move threatened data to spare disks before it becomes a problem.

"It's not as fault tolerant as Iceberg, but because the software constantly monitors the system, Symmetrix automatically fixes itself before data is lost," says Dick Wilmot, editor of the "Independent Raid Report" in Lafayette, Calif.

Its intelligent software also contributes to its ease of use. "Symmetrix takes over a lot of the control. You don't have to do any cache tuning or issue any commands. You just turn it on, and it does most of it for you," says Tom Miller, a senior technical analyst at St. John's Hospital and Medical Center in Detroit.

Symmetrix's total possible capacity is an ample 360G bytes. But its rating indicates that users are less than completely satisfied, which could be due to mirroring. Because every piece of data is written twice, one can store only half that amount, Wilmot explains.

Possibly bringing down the capacity score further is Symmetrix's method of expansion. Unlike Iceberg's more granular upgrade, where additional units are wheeled and plugged in for every added 100G bytes, Symmetrix's upgrade is not as easy.

"You have to add more [Head Disk Assembly] and other internal components," Callery says.

But what makes Symmetrix so unique is its brute force method of including a lot of resources to solve I/O problems. For example, Iceberg increased its maximum cache to 1G byte, but it still has only one quarter of what Symmetrix contains.

Data stored in the cache can be retrieved much faster than DASD data. Users can write data to cache or rely on Symmetrix's intelligence to detect highly active data and place it in cache. ■

Burden is *Computerworld*'s senior researcher, Firing Line/Scorecard.

USER RATINGS: AN ALMOST EVEN SPLIT

Ratings are based on a 1-to-10 scale, where 10 is best. Total score is the average of ratings weighted by the category's importance to that vendor's users. Categories are listed in order of importance to all users.

	Symmetrix BASE: 38 users	Iceberg (9200) BASE: 32 users
TOTAL SCORE	7.1	7.4
[redacted]	8.0	9.4
[redacted]	7.1	6.8
[redacted]	6.3	7.2
[redacted]	7.8	7.2
[redacted]	6.2	6.6

* *Includes a variety of models. Sixty-eight percent of the users rated 3500 class systems*

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FIRING LINE: *Ramac, designed for compatibility*

BY KEVIN BURDEN

One of the first things you notice about IBM's Ramac is that the company's first entry into large system RAID emphasizes compatibility. That's both a blessing and a curse.

Ramac saves users money by working with IBM's 3990 controllers, but it also ties performance to the previous generation of technology. The controllers were designed for IBM's 3390 direct-access storage device (DASD) products.

"We looked at EMC and StorageTek, but in the final analysis it came down to cost," says Raymond L. Florence, corporate data center director at PMI Food Equipment Group in Troy, Ohio.

Despite the legacy controller, Ramac provides much enhanced performance over 3390 DASD, evaluators for this Firing Line reported. But it also requires twice the initial load times cited by IBM.

Evaluators included a financial services firm, a manufacturer, a health care provider and a utility. The format was developed with help from Howard Rubin and Associates and International Data Corp.'s Technology Investment Strategies Corp.

Fault tolerance

Ratings for fault tolerance were based on the evaluators' tests of Ramac's fault-tolerant capabilities because users had no failures at the time of the evaluations.

Ramac duplicates the power supplies in the rack. Each drawer has two fans and its own battery, making the cache nonvolatile. This plus Ramac's RAID 5 implementation instilled a high level of confidence in the evaluators.

Manufacturer: "We tested the dynamic sparing feature before we fully populated the database, and it worked as billed." Dynamic sparing maintains data availability by automatically copying data from a failing drawer to a designated spare drawer.

Financial services: "The mean time between failures, according to IBM, is 1.5 million hours for one disk. But the probability for failure increases by the number of disks, which for us is about 50 disks. But even that is only about one every two years."

Ease of use

Contributing to Ramac's ease of use was the evaluators' familiarity with IBM's 3390 storage technology. Ramac's installation was not an issue because it was done by IBM. However, microcode changes made to the controllers were not effectively communicated to users. This caused the data's initial load time to be longer than IBM had predicted.

Manufacturer: "It was very easy for us to use because it's just like the 3390s we had. But the initial load time for each address, which IBM said would take only 20 minutes, took almost an hour. We eventually fixed the problem through some code changes."

Capacity

None of the evaluators had grown Ramac to the full 90.8G-byte capacity, although all said they expect to. The ability to run two Ramac systems off one controller made the evaluators comfortable with Ramac's scalability, but most felt left in the dark about IBM's plans to move to double-density disks.

Utility: "We only have 13 out of 16 possible drawers in right now, so we can still grow it a bit further before we need to roll in another Ramac. And even then, we are still able to hook it up to our existing controller."

Financial services: "There are unknowns about whether [IBM is] going to come out with the double-density disks or not. I could add another 90G bytes today, but not [until] I know their plans."

Speed

Ramac performance relies heavily on the attached storage controller. Evaluators using 3990 Model 3 controllers had throughput improvements as high as 50%. And while IBM says Ramac's performance is comparable in most situations to a 3990 Model 3 with a Model 6 controller, users using the Model 6 controller with Ramac also saw improvements.

Financial services: "We were using a 3390 Model 3 in conjunction with a 3990 Model 3 controller and were getting a response time of 16 msec. With Ramac on our [3990] Model 3 [controller], we were getting 8 msec response times."

IBM has always bargained with its largest customers, but now they are bending for smaller shops as well to push Ramac into the market.

"I was about ready to roll in EMC when I heard back from IBM. [IBM] typically lets it go down the wire, but generally they have been coming back with the best price."

KELLY HIGGINS, manager, data services
Crawford & Co., Tucker, Ga.

Cost

In past years, the competition has used price against IBM. But now IBM includes small to medium-size companies among those customers it's willing to bargain with.

Manufacturer: "Their competition has been eating them alive here for a while. But now they're starting to deal. You have to fight hard and long, but we normally have been winning." ■

Burden is *Computerworld*'s senior researcher, Firing Line/Scorecard.

Ramac: High on reliability but not on capacity

IBM San Jose, Calif. (800) 426-4968

Ratings are based on a 1-to-10 scale, where 10 is best. Ratings represent the average ratings of user Ramac users interviewed in the Buyers' Satisfaction Scorecard survey, weighted by the categories' importance. Total score is the average of all ratings.

TOTAL SCORE	7.1
	9.6
	6.7
	5.6
	7.2
	6.6

Vendor Response

Double-density HDA

IBM plans to make 4G-byte double-density Head Disk Assemblies (HDA) to replace the 2G-byte HDAs available to Ramac customers around midyear. Pricing has not yet been set.

Initial load time

We have had reports of long load times for early Ramac customers. The problem has been corrected in all 3990/Ramac installations through microcode and procedure changes.

Additional I/O bus paths

The complementary manner in which the subsystems and drawer caches operate has improved Ramac's ability to efficiently use its four internal bus paths. For those customers who require additional bus paths, the Ramac Array Subsystem Model 3 provides eight data paths.

OPEN SYSTEMS RAID SWEEPS INTO THE MIDRANGE

BY AVERY L. JENKINS

As the market for RAID storage continues to grow across the board, midrange RAID vendors are sporting a new open look for their systems.

Midrange RAID storage, whether supplied by the system manufacturer or a third-party vendor, formerly focused on the single-system environment. If you wanted RAID for your VAX, you bought from Digital Equipment Corp. or Micro Technology, Inc. If you wanted RAID for your AS/400, IBM or XL/Datacomp, Inc. would supply it.

Today, however, the single-vendor paradigm has fallen by the wayside. Vendors have heeded the open systems call and are now providing RAID storage systems that can often support multiple computing environments in a single storage subsystem.

This form of open, centralized RAID storage "makes it easier for users to manage their total storage environment," says Tom Lahive, direct-access storage device (DASD) subsystem analyst at International Data Corp. (IDC) in Framingham, Mass.

In addition, "users can keep their dollar-per-megabyte costs low because of higher volume purchases" for the centralized storage server, Lahive adds.

For the vendor, such an approach makes good economic sense. While the DASD market for the midrange remains relatively large — for example, IDC values the AS/400 DASD market at about $1.9 billion annually — growth overall is flat.

Why RAID?

Companies forging ahead with open systems strategies once saw little need to equip their midrange systems with RAID devices even though they were worried about the gaping holes in the systems' ability to provide reliable, storage for far-flung servers.

As mission-critical applications continue to migrate from the mainframe, the need for fault tolerance and high performance/high availability is traveling with them. Thus, midrange data protection requirements are taking a different form today than in past years. In addition, both small and large information systems organizations must manage ever-increasing amounts of data in shrinking storage floor space.

High availability and fault tolerance to a small package are the basic promises of RAID devices.

Buying disk insurance

Despite the move toward open architectures, the system vendor is still the first place most users turn for storage support. Compatibility and security with installed systems are key drivers of this trend.

IBM, Digital, Hewlett-Packard Co. and Data General Corp. all supply internal RAID storage for their systems. "Some midrange vendors can offer five bays of internal storage," which translates into 10G bytes to 20G bytes of disk space, Lahive says.

The open systems approach is providing users with more options, however, especially among third-party suppliers.

Third parties are competing with the systems vendors by "selling RAID with a lower cost-per-megabyte and higher functionality," Lahive says.

Micro Technology, for example, has been a mainstay in the Digital RAID market for several years, with its ability to connect to Digital's proprietary buses. More recently, it has expanded its StorageWare servers to support Ethernet, Fiber Distributed Data Interface, Unix and Network File System computing environments, among others.

Likewise, EMC Corp. has also expanded beyond the mainframe market to provide midrange RAID storage for Unix and a variety of network operating systems.

Spotting the differences

The move to support open systems has not obliterated the differences among the products. Among the systems vendors, IBM and Data General are generally considered the leaders.

IBM "is an overlooked success. They have shipped more [of their RAID products — 50,000 units] than all of the other vendors combined," says Mike Kahn, chief executive officer of the Clipper Research Group in Wellesley, Mass. "IBM was one of the early leaders in the midrange, to particular."

Data General's Clariion RAID line is "very solid," says Farid Neema, president of Peripheral Concepts, Inc., a market research and consulting company in Santa Barbara, Calif.

And while analysts regard Digital's products as technically strong, the company is not a strong force outside of its own installed base.

"Somebody who has been buying storage from Digital would be comfortable buying RAID from Digital," Kahn says.

Digital uses a "very modular hardware approach, and they have included software and hard-

Midrange systems, *page 84*

XL/Datacomp most reliable, EMC lowest priced

Early field test results from AS/400 sites place XL/Datacomp's 9638 Model 140 at the top of the pack in terms of reliability for four leading RAID devices. The product, which has been available for about four months, achieved the best mean time between failures total of all the models. EMC's Harmonix HX3SR Model 4 achieved the second-best total with less than three months in the field.

Sites surveyed by Reliability Ratings in Needham, Mass., reported that XL/Datacomp's 9638 was strongest in performance. EMC's users were happiest with reliability and performance.

Fault tolerance was also the high point of IBM's 9337-225, with capacity and price being the weaknesses.

IPL accumulated the shortest mean time between failures of the four devices. All but one of the failures occurred on the 7037 Model 40. Overall, the IPL sites cited price/performance as the strength and service as the main weakness.

Prices for the devices were typically below $2 per megabyte, with one EMC site reporting $1.70 per megabyte for 24G bytes of DASD. Some sites reported discounts as great as 30% to 40% off the list price.

PRODUCT	TOTAL HOURS IN USE	FIELD MTBF* (in hours)	ANNUAL FAILURE RATE**
[redacted]	575,904	575,904	1.40%
[redacted]	1,168,128	389,376	2.07%
[redacted]	487,200	243,000	3.31%
[redacted]	1,037,540	148,220	5.44%

* MTBF: Mean time between failures in terms of number of hours in the field.
** Annual Failure Rate: The number of hours in a year, 8,064, divided by the MTBF in hours.

Source: Reliability Ratings, Needham, Mass.

Midrange systems

CONTINUED FROM PAGE 83

ware for backing up hierarchical storage management systems," Neema says.

Of the third-party vendors, EMC and its recent Centriplex announcement have gained the most attention.

"The important thing about EMC is its flexibility and its ruggedness," Neema says. "EMC comes from the world of the mainframe, and they included some of these features on Centriplex."

"DEC has some of [Centriplex's] features but the emphasis is different in that EMC has included dynamic load balancing," Neema adds.

Dynamic load balancing, in a RAID context, allows a RAID array that is partitioned into different RAID levels, such as RAID 1 and RAID 5, to change the partitioning automatically, on demand and without stopping the system, Neema says.

This form of open, centralized RAID storage "makes it easier for users to manage their total storage environment."
— Tom Lahive, IDC

Overall, however, the technical differences among the products are less important than other issues such as stability and support.

RAID "is a price and reputation game," Kahn says. "You are buying security. . . . Security comes more from buying a well-known name than a name you find in the back of a magazine." ■

Jenkins is a freelance writer in Ansonia, Conn.

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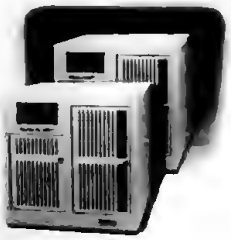


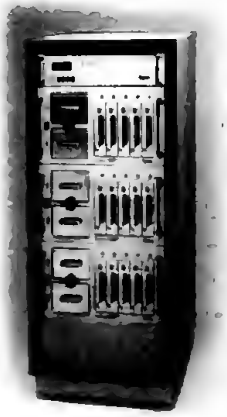
FlexArray IX, FlexArray FX

FlexArray IX features six hot replacement drive bays and dual hot replacement power supplies. Ideally suited for midrange NT, OS/2, Unix and Netware server applications requiring up to 15 GB of fault tolerant, high availability data storage.

FlexArray FX supports Fast and Wide SCSI II interface. Its six channel SCSI to SCSI bridge controller supports data transfer rates up to 20 MB/Sec. Ideal for high performance data base, video, imaging and multimedia servers where high I/O rates, advanced diagnostics, remote administration and configuration are required.

RUAC MX

5.25" half height controller provides SCSI to SCSI 2 channel mirroring (RAID 1), 2 channel striping (RAID 0). Expands to protect two to 14 drives. The RUAC MX is well suited for work station and small server applications requiring fault tolerant data protection in the one to four GB capacity range.



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Buying issues

CONTINUED FROM PAGE 79

er-configurable levels of RAID, including RAID 5.

The Warp product will use 3½-in. disks and 4G bytes of Hard Disk Assembly; capacities should exceed 1T byte of storage in a fully configured subsystem. IDC expects high levels of scalability and performance, as well as high levels of reliability and fault tolerance.

The outcome of these announcements in the already crowded large systems storage arena will create even more intense competition for end-user storage business. While these new products ensure HDS and Amdahl will not be left behind established storage suppliers from a technological viewpoint, IDC does not expect their market shares to change dramatically during 1995. ■

Callery is a research manager for storage and peripherals at International Data Corp. in Framingham, Mass.

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(b) Netware (f) Windows NT
(c) OS/2 (g) Windows
(d) Unix (h) NeXTstep

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70 Mining/Construction/Petroleum/Refining/Agric
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85 Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90 Computer/Peripheral Dealer/Dist./ Retailer
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The Open Software Foundation's Distributed Computing Environment (DCE) is touted as an all-encompassing technology for building next-generation distributed applications. *Computerworld Client/Server Journal* interviews several end-user organizations, including Charles Schwab & Co., to find out how it's working.

Vertical Industry Focus: Banking

How this industry is capitalizing on client/server networks to help them provide new revenue-generating products and services while streamlining costs.

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Our What's New feature takes a look at Internet access and administration using Spry tools.

Firing Line offers user reviews of Novell's NetWare 4.1.

Plus a new product roundup on networking tools from TGV, NetFrame, Digital Equipment Corp. and Security Integration.

April 1 Issue

Ad Close: February 8

Cover Story: Performance Planning

What are organizations doing to ensure that their new distributed systems perform at levels that exceed those of the legacy systems they're displacing? *Computerworld Client/Server Journal* examines the technologies, managerial issues and fine-tuning techniques that go into this planning process.

Vertical Market Focus: Health Care

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SOUND OFF!

AT ISSUE: *Let the war of words about component standards begin. An OpenDoc backer says the technology is much more elegant and feature-rich than OLE. An OLE proponent counters, saying OLE's object technology outstrips fledgling OpenDoc.*

Don Kausch

OpenDoc *vs.*

"OLE's roots in application linking make OLE apps large, slow and unnatural for users and developers."

By Cliff Reeves

Comparing OpenDoc with OLE/COM is like comparing a modern human with a Neanderthal. There are similarities. If you were to dress a Neanderthal in a suit and stand way back, the two might even look the same. But you would have to look much closer if one was going to help run your business.

Being competitive means being able to react and adapt to change quickly. Component software holds the key. OpenDoc was designed to build flexible applications based on components. On the other hand, Object Linking and Embedding (OLE) and its Common Object Model (COM) were designed to link the monolithic, general-purpose applications of the past. OLE/COM represents an earlier branch on software's evolutionary time line.

CLIFF REEVES *is director of Object Technology Products at IBM's Personal Products Division in Austin, Texas. You can reach him at cliffr@austin.ibm.com*

A component standard must evolve smoothly and be widely available and easy to use. OpenDoc is the only software component standard available that meets this criteria. It is available today for Windows, Mac OS and OS/2. IBM has announced plans to make it available for Unix systems, OS/400 and MVS.

Novell, Inc.'s WordPerfect, Apple Computer, Inc. and IBM have shipped developer's kits to more than 54,000 developers worldwide. Many software vendors, including Taligent, Inc., Adobe Systems, Inc., Novell, Apple and IBM, will ship OpenDoc components and tools in 1995.

The software that provides a competitive edge for businesses is a rich brew of commonplace and specialized parts. We'll buy some parts off the shelf; systems integrators will customize others; and we'll handcraft a few ourselves. This open mix-and-match environment will increase application flexibility and reduce costs. OpenDoc is built for this environment.

OpenDoc raises the bar for user and developer functionality. It provides the following set of functions by which you must judge any component technology:

- Object management services, based on IBM's System Object Model (SOM), that comply fully with the Object Management Group's (OMG) Common Object Request Broker Architecture. These services enable components to be accessed and protected wherever they are. You can add or replace components at will, reacting quickly to fleeting business opportunities.
- Component services, based on Apple's Bento file format, that are widely used by Lotus Development Corp. and others. These services enable users to save and exchange component data. As one department develops new business information, other departments can act on that information quickly. Compound document and automation services, which include Apple's Open Scripting Architecture, enable developers to customize applications easily and reduce the cost of training users.

OpenDoc was designed to grow smoothly for developers and users so applications can pick up new features quickly and inexpensively. Thomas J. Mowbray, lead scientist at Mitre Corp., recently commented on this flexibility in the November/December 1994 issue of *Object* magazine. He observed that, unlike OLE/COM, OpenDoc was "designed with extensible architectures that do not require substantial revision to support specialized application requirements." This is because OpenDoc was designed for extensible components — real objects — rather than for applications.

For example, OpenDoc's In-basket can quickly be extended to sort and filter mail. Real object technology makes OpenDoc components small, efficient and easy to develop. In comparison, programming for OLE is complex and inflexible. OLE 1.0, with 50 unique application programming interfaces (API), was a difficult enough proposition. OLE 2.0's 400 APIs traumatized developers and demanded substantial application restructuring.

A big hindrance

OLE's COM — the way OLE developers must define their components — just makes things harder. It is a specification (not an implementation) that each developer must implement, yet it prevents developers from efficiently extending components by subclassing them. COM has so many restrictions that Digital Equipment Corp. has taken on the task of fixing it.

OpenDoc was developed concurrently on multiple platforms and will adapt to the software and network services you need to run your business. For example, WordPer-

OpenDoc, *page 88*

OLE/COM

"With OLE, I know my investments in software and training won't be lost."

Jon Bean

By Robert Bismuth

There isn't much argument in my mind who wins the OLE/COM vs. OpenDoc war. Object Linking and Embedding (OLE) beats out its rival from both a business and technical standpoint, so mucb so that this war is a pointless waste of time and effort.

The advantages of using OLE include a clear evolutionary path from today's most popular personal productivity applications to "componentware." And its distributed Common Object Model (COM) provides a path to distributed objects.

Both OLE/COM and OpenDoc have the goal of facilitating componentware — that is, software modules from multiple vendors that can be assembled to create applications. The idea is to let users access different application tools in the same document. Both technologies use software objects, and both plan to provide support for distributed objects.

But while OpenDoc is still in its infancy — source code is just now shipping — OLE has been out there since the spring of 1991. OLE is available on Windows, Windows NT and Mac OS.

Think of it this way. If you're a technical manager in a large user organization, what would you bet on: newly minted (do I dare say untried?) OpenDoc, or OLE, complete with its Microsoft Corp. clout and installed base of Windows developers? About 60,000 OLE software developer's kits were shipped before the kits were bundled with Visual C/C++, and many more have gone out since then.

OLE 2.0 also has the force of hundreds of independent software vendors creating user products; at Comdex/Fall 1994, Microsoft's developers list contained 433 companies shipping OLE applications.

Microsoft (and the Windows de facto standard) are so well established that it is hard to imagine throwing out the current investment and turning to fledgling OpenDoc. It just doesn't make financial sense.

Technically speaking, OLE is a beauty. The object technology underlying OLE, Digital Equipment Corp./Microsoft's COM, is much more constant than that found in OpenDoc. Every OLE object is by definition a COM object. And the network distribution of objects that today exist only locally has been a major COM design goal.

So far, OpenDoc alpha releases have used C++ libraries for object support. Subsequent releases will move to IBM's System Object Model (SOM) and then to Distributed SOM (DSOM). Talk about driving developers crazy; they will have to learn three different programming models as they move from C++ to SOM to DSOM. In contrast, COM is COM, including in networked environments.

OLE is not only farther along the path to componentware and distributed objects, but it also has the clearer path.

Take the issue of being able to determine an object's functions without any prior knowledge of the object — an important aspect of componentware. COM's built-in query interface capability addresses this and, again, was designed to work efficiently in a distributed environment.

OpenDoc has grafted on a similar mechanism in its C++ libraries — you make a special call on an object asking it whether it supports an extension. If it doesn't, it says so. If it does, it returns a pointer to a new extension object that has the desired function. Sounds just like the query interface functions in COM, doesn't it? It's curious that even though SOM/DSOM proponents denigrate this COM capability, the plan is to include something like it in the SOM/DSOM iteration of OpenDoc.

Unfortunately, OpenDoc's query-interface-like feature will be much more complex, and, because it is not built-in, SOM/DSOM will require an unknown amount of extra network traffic to support it.

OpenDoc proponents brashly say OpenDoc is revolutionary while OLE is evolutionary. Give me OLE's evolutionary approach every time; revolutions tend to be painful and bloody for all concerned. With OLE, I know my investments in software and training won't be lost. I know my old interfaces will continue to receive support. With OLE, people can evolve their computing infrastructure at their own rate.

When you look at some of the "revolutionary" aspects of OpenDoc, they don't stand up to OLE's comparable approaches:

- Object activation. OpenDoc touts its "inside-out" object activation, in which all objects must be activated before a user can

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OpenDoc

CONTINUED FROM PAGE 86

fect has added functions that enable OpenDoc components to work seamlessly with OLE applications and vice versa. In 1995, IBM will extend its SOM network support to include the Open Software Foundation's Distributed Computing Environment naming and security and the OMG's transaction services.

In contrast, Mowbray says, OLE/COM will be suitable only for Microsoft's desktop systems and proprietary tools. OLE is further tied to Windows because "COM's APIs are heavily dependent upon Microsoft's C++ implementation," he says.

Microsoft says it will implement distributed OLE in Cairo, which is presumably now delayed in the same way as Windows 95.

OpenDoc makes users more productive and lowers training costs because it is efficient to use. OLE's roots in application linking make OLE applications large, slow and unnatural for users and developers. For example, no OLE component can exceed a page in length, one cannot overlap another, and each must be rectangular in shape. Also, only one OLE component can be active at a time.

Microsoft has committed to fixing these problems, but past history shows its heritage of missing features, frequent and disruptive upgrades, inconsistent implementations and bloated systems that perform poorly.

So, there you have it. If you plan to use only Windows, if all your software is off the shelf, if your business doesn't run a network and if you don't mind replacing your software every two years, then hire the Neanderthal. ■

OLE/COM

CONTINUED FROM PAGE 87

view the document. That leads to long start-up times. Some users may appreciate how long it takes to open a document (they'll have time to get coffee), but most will not.

And that's when the objects are local. Imagine how much longer start-up will take when objects have to be retrieved from across the network.

Inside-out activation also requires the presence of a part editor or viewer for each type of object. While Component Integration Laboratories (OpenDoc's sponsor) encourages OpenDoc parts developers to provide free viewers, this is not a guarantee. If the local editor/viewer is unavailable, the user is stuck. The object cannot be displayed at all, leaving a hole in the document.

OLE supports object activation as needed (even all at once, if you want). It also provides for a "last view" of an object so that any application (or stub handler, available on every OLE/COM system) can present a foreign object as a visible, known quantity, even if it cannot be edited locally.

• Application vs. component integration. OLE was designed to integrate applications; OLE controls provide evolution to componentware. That's because the OLE application can run stand-alone or as part of a collection of components, whichever makes more sense for a business. OpenDoc parts function only in the OpenDoc environment, leaving users of today's applications in the lurch.

OpenDoc proponents realize OLE is used everywhere for compound documents today, so its backers have promised to add OLE support. How interesting. Unfortunately, adding OLE support means adding yet another layer of software to access OLE/COM interfaces. Who will pay for all this? The cost will likely get passed on to whoever invests in or buys OpenDoc.

Forget OpenDoc. OLE/COM provides more capability today. ■

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OBJECT WORLD

Putting Objects To Work In The Real World 1995

UPDATE №3

Register for Object World Boston '95. And hear how Xerox puts OT to work.

Recently, we met with Object World session speaker Al Nugent of Xerox Corporation to talk about the impact of object technology (OT) at his company. Mr. Nugent holds the expansive title of Executive Vice President, Application Architecture and Design, Global Process and Information Management, Object Technology Competency Center (OTCC). He's also a member of the Object Management Group's (OMG) Board of Directors. This interview gives you a taste of what you can expect from the in-depth conference sessions at Object World Boston.

That's quite a title. What does it all mean?

"In a nutshell, our charter is to facilitate the adoption of modern software engineering practice using object technology at Xerox Corporation. My team, the OTCC, is responsible for managing the architecture and design of distributed object services that support the rollout of all new globally deployed applications."

How long have you been working with object technology?

"Longer than I like to think. I started using object-oriented languages back in grad school, and my career has evolved around open systems and leading edge software principles and practices. So my experience in software development is based on understanding process, selecting and using the proper abstractions, and focusing on design rather than code. I joined the OMG board in 1989 and have been an active member of the distributed object system community since then."

What changes have you seen as OT has moved into the mainstream?

"Well, the big impact on our work at Xerox is that the scope has expanded to include organizational learning, the impact of technology on corporate culture, reward and recognition for object-based development, high performance team building, collaborative work environments, effective mentoring and training techniques, and transformation of business processes into actionable systems."

How does Xerox put object technology to work?

"First and foremost, Xerox has challenged itself to be business-process driven. Our motivation for using objects is to continue to provide the best products and services to our customers. This is not technology for technology's sake. As a result, we embarked some time ago on a company-wide reengineering drive that resulted in the Xerox Business Architecture. And it's in this context that we're using OT. The object approach gives us the opportunity to analyze and design business processes down to the work flow or task level, then easily translate the products of analysis into application design, development, and deployment."

What led Xerox to adopt object technology?

"The decision to adopt OT was made prior to my arrival at Xerox. Our worldwide CIO, Pat Wallington, and her team created IM2000, a set of key strategies to guide our information management into the next century. Our adoption of OT has been leveraged off the strong tradition of software analysis and design practices within IM and our divisions. Our legacy outsourcing agreement with EDS has provided us with a tremendous opportunity to engineer business processes, integrate technology, and build new global solutions designed to make our business more effective."

What kind of benefits has Xerox realized from employing OT?

"Most of the OT work I've been describing here is now in progress. Some earlier pilot activity inside Xerox has yielded a high degree of reusability for both code and designs, quicker time to market, and a high developer productivity and satisfaction. One side effect of OT is improved communications. OT enables us to discuss the solution to the customers' problems in their own vocabulary."

What will people learn about OT at your Object World sessions?

"The first is an evangelical session highlighting the benefits and realities of OT products and services. The second is a case study of OT adoption and use at Xerox. In the case study session, I'll describe the critical success factors for corporate-wide OT adoption. I'll also provide a real-world, large-company perspective on the benefits and realities of a migration to object technology, and an understanding of the relationship between business process management, object technology, and solutions deployment. My sessions will give them a head start on realizing the benefits of OT for their companies and themselves."

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WISE

Calming Windows anxiety

The fear of leaving mainframes behind and learning Windows development is valid, but it doesn't have to be crippling

By Dana P. Crenshaw

It's been seven months since I began developing Windows applications, and I admit the transition hasn't been painfree. Five years of mostly mainframe development had lulled me into a certain way of thinking and programming, but with hard work and plenty of initiative, I made the transition.

Admittedly, the technology is difficult, but don't let anyone kid you. The fear of failure can be debilitating. For me, failing at an opportunity to develop for Windows meant being sentenced to old technology with an uncertain future. But once I started, my confidence grew.

Confronting the obstacles

Overcoming the initial anxiety was only half the battle. New challenges constantly present themselves. The differences between Windows and mainframe environments made application development frustrating. While not as frightening as the initial hurdles, the new challenges were aggravating nonetheless.

For me, an especially frustrating contrast was the location of the program code. On the mainframe, code resides in one file. This file houses related functions and procedures, making it easy to read and debug. But this is not the case in Windows.

Windows applications have objects. Each object has code that enables it to carry out a task completely. Where I used to have *one* file containing hundreds of lines of code, I now have small independent packets of code with maybe 20 lines. Mentally, it takes more effort to maintain the big picture from within a tiny test tube. This forces me to make sure each individual part is complete within itself. In other words, emphasis is placed on the parts that make up the whole.

Another disturbing difference was the lack of control I had over the program's flow. On the mainframe, I could code a "DO WHILE ... ENDDO" or a "FOR ... NEXT" sequence that would be in control. Any other program that needed resources had to wait until my program finished. This also limited the user to running one operation at a time. In contrast, the Windows environment maintains control, allowing it to respond to other applications that request its resources.

Not only does Windows force me to be unselfish, but it also helps me write intelligent code — code that is sensitive to the environment and the user.

Smaller hurdles

Not every challenge is a major one, however. The design of flowcharts, for example, is slightly different. Honestly, I'm still working on this one. A flowchart for Windows applications seems to consist of a set of disjointed flowcharts for each function the user could perform. The functions are all self-contained.

Another is the use of buttons rather than function keys. On-line mainframe applications rely heavily on function keys to initiate actions. Windows has buttons that serve the same purpose except that the code lies behind the buttons and carries out the function completely. These are minor differences, but they're frustrating if they catch you by surprise.

I'm still learning, of course, but the more I read about and study Windows, the less I worry about failing.

Currently, I'm developing in Windows and DOS, and I have become familiar with Microsoft Corp.'s Visual Basic and Visual C++, Powersoft Corp.'s PowerBuilder, Borland International, Inc.'s C++ and Computer Associates International, Inc.'s Visual Objects. I'm also working with a friend on a project converting a church data management system written in Clipper to Windows using Clip4Win — a third-party tool for Windows application development.

I no longer rely solely on my mainframe programming background. I knew that Windows was a different animal, and if I wanted to tame it, I had to learn some new tricks. ■

Crenshaw is a senior staff consultant at Orkand Corp. and a freelance writer in Atlanta.

PAVING THE WAY

August 1988 to June 1993: Employed as a mainframe programmer. Began reading books about Microsoft's Windows and client/server technology.

August 1993: Purchased and learned Microsoft's Visual Basic.

October 1993 to present: Hired by current employer to do Clipper development. Began experimenting with C++ by prototyping.

February 1994 to May 1994 Received training in Powersoft's PowerBuilder 3.0. In May, began working on a team to convert a DOS-based application to Windows using Clipper and Clip4Win.

June 1994 to present: Attended introductory seminar for Computer Associates International's Visual Objects. Received format training in Visual Basic.

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Triple-I

OUTSOURCING, NOT ALWAYS A DIRTY WORD

Systems administrators find opportunity in unlikely places

By Leslie Goff

For awhile, it looked like outsourcing would eventually displace systems administrators, but supply-side economics is playing out in their favor. Outsourcing firms need more people with administrative skills than are available. Recruiting is heavy, and salaries are skyrocketing.

Moreover, the opportunities are plentiful across the board, whether you come from traditional mainframe and midrange systems administration or an open systems, distributed technologies orientation.

That's because systems administration is evolving from a low-growth position associated with legacy systems into a key career path.

"We look at the position more as systems management and administration, a position more on the networking side of the house," says Rick Schwartz, a program director at BSG, a consulting firm in Houston. "The responsibility is heightened because the function is more complex."

Outsourcing firms are looking to both sides of the skill pool for talent: traditional data center administrators with exposure to networking and open systems and network administrators who have experience with centralized management tools.

Administrators with distributed systems expertise clearly have the upper hand, especially if they apply directly to outsourcing firms. But traditional systems administrators who show initiative have similar opportunities.

When a company chooses to outsource systems administration, it typically makes a deal with the vendor to absorb existing staff for a required time. If you find yourself in this position, use this period to learn more about client/server technologies, Unix-based systems management tools and basic networking principles.

Outsourcing executives say staffers who demonstrate the drive and ability to adapt their skills to a distributed environment can take their careers further in a vendor firm than in a client firm.

"You have a broader level of opportunity in an outsourcing company," says Scott Lahti, president of the outsourcing operations division at Systematics Financial Services, a subsidiary of Systematics Information Services, Inc. in Little Rock, Ark. "We still have a need for traditional systems administration, but we also have other positions available that are more LAN/WAN-oriented, so that's another avenue for career growth."

Lahti won't comment on specific hiring projections for this year but notes that Systematics, which has traditionally targeted financial services companies, is expanding into health care and telecommunications.

Meeting demand

Electronic Data Systems Corp. is another outsourcing vendor that is trying to bring together both systems and network administration skill sets. The company's client/server technology services group, which has 1,300 employees in 30 locations worldwide, this year will hire "hundreds" of systems and network administrators for a two-pronged approach to systems management, says Dan Shubert, director of the group.

At least one company has experienced so much demand that it has formed a division dedicated to systems administration. Pencom Systems, Inc., an Austin, Texas, outsourcing, recruiting and technical training firm, launched Pencom Systems Administration (PSA) last May to provide specific outsourcing services.

In its first eight months, PSA hired 50 systems administrators to handle outsourcing demand. Ed Taylor, an executive vice president at Pencom who heads the division, says PSA will finish the year with a total of 185 systems administrators.

Taylor notes that while systems administrator salaries are increasing overall — averaging $58,000 a year — they may be slightly lower in outsourcing firms. The real payoff comes in increased career growth and respect, he says.

"Most systems administrators have little career growth in their companies because their function is treated as a cost center environment no matter how good they are," Taylor says. "Here, it's a different story because our company's core competency is systems administration. They have a career and are treated as a profit center, not a cost center." ■

Goff is a freelance writer in New York.

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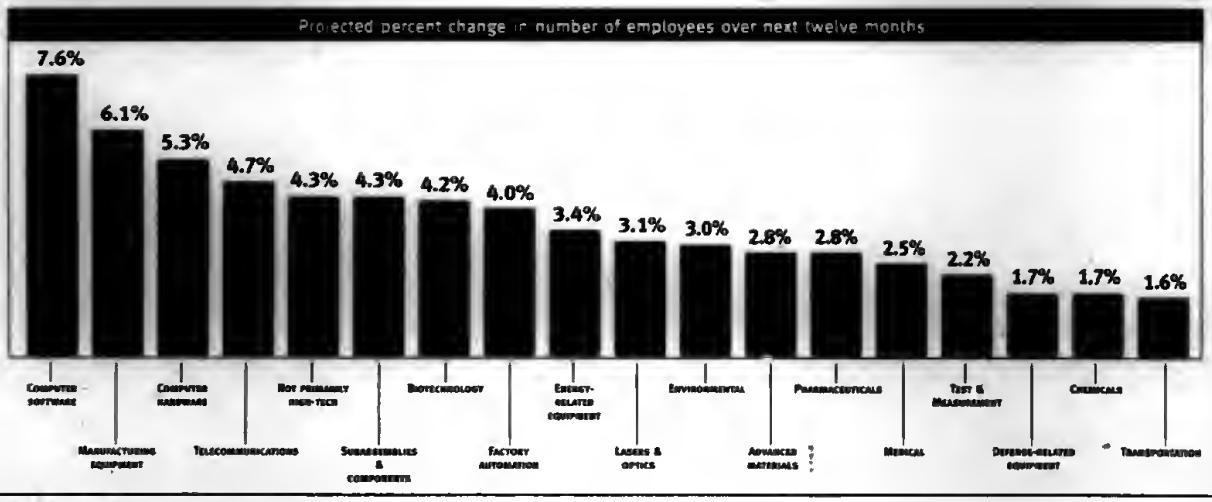

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RAID's momentum as the new storage medium of choice extends beyond the PC server to midrange servers and mainframe sites. To learn how RAID is changing the way storage systems are purchased, check out the **CW Guide to RAID Storage Devices**, page 77.

Low-end RAID gains *sophistication*

Although RAID is still less pervasive at the low end, its acceptance is growing and so are the options

By Alan R. Earls

The words "small," "cheap" and "RAID" have seldom been mentioned in the same breath, but the differences between RAID products for mainframe and server-level systems are becoming few and far between.

No longer separated by a vast technological gulf, the two markets now provide remarkably similar disk array products. More important, users no longer dismiss RAID for PCs and servers as frivolity.

"The only areas where vendors might skimp at the low end is in having less redundancy for fans and power supplies," says Phil Davin, vice president and chief analyst at Dataquest, Inc. in San Jose, Calif. Moreover, RAID's cost is dropping.

Designed to protect against system failure by storing data across multiple drives, RAID has grown in value as critical applications and information are increasingly placed on departmental servers.

"A year or two back, many people still thought [low-end] RAID was like snake oil," says Bill Frank, president of Augur Visions, Inc., a market research firm in Los Altos, Calif. "They weren't sure they needed it and weren't convinced it really worked." Since then, the tables have turned.

Market madness

In fact, the RAID market as a whole is exploding, with at least 150 key vendors, according to James Porter, president of Disk/Trend, Inc., a market research firm in Mountain View, Calif. "If you take out the companies selling primarily to the high end, you still have a good 100 to 120 companies selling for PC servers."

The lion's share of the server-level RAID business belongs to the likes of Compaq Computer Corp., with AT&T Global Informatios Solutions, Hewlett-Packard Co. and IBM playing significant roles. In addition, Tricord Systems, Inc. and NetFrame Systems, Inc. do a solid business packaging RAID with their servers, Porter says

Other contributors include value-added resellers (VAR), systems integrators and an assortment of component and software vendors, Porter says. Mylex Corp., a manufacturer in Fremont, Calif., for example, is very popular. "They are critical to this market because they build the controller board that practically everyone uses within their RAID," Porter says. "Everyone" includes VARs and systems integrators.

High interest, low-tech implementation

Despite increased interest, RAID solutions favored for servers tend to be "low tech" at the moment. That is, many users opt for Novell, Inc. file servers that rely on NetWare's RAID functionality. "Novell has made redundancy and RAID safe choices that are easy to integrate," says Dan Friedlander, a storage consultant in Boulder, Colo.

In fact, Novell has made RAID so easy it is often all but invisible, Frank says. "Most Novell users we survey don't identify themselves as having RAID. But if you ask them about mirroring — which is by definition RAID Level 1 — they will say, 'of course.'"

When moving beyond NetWare RAID, however, the choices quickly become more complex, says Mike Casey, vice president of storage research at Computer Intelligence InfoCorp in Santa Clara, Calif. But "it really depends on what you're trying to accomplish."

To pick a system, it's important to have a clear idea about the disk access time required as well as what data really needs RAID protection. "Think about everything you do and try to set some priorities," Casey says.

Buyer beware

You will also want to comparison shop, but use caution when dealing with anyone other than systems vendors, Porter advises. Newcomers may offer pretty packages and neatly wrapped wires, but they lack the experience to answer tough questions.

Users may even contemplate designing their own RAID configurations with the number of available inexpensive disks, but analysts warn it takes a fair investment in time to become savvy enough about disk array technology "to be able to second-guess a vendor," Casey says.

If RAID is not within your reach yet, wait. As with other kinds of disk storage, RAID's cost is dropping nearly 20% per year, Davin says. Similarly, Friedlander estimates that most low-level RAID schemes — from Level 0 to 4 — cost only about 20% more per megabyte than non-redundant drives. ■

Earls is a freelance writer is Franklin, Mass.

INCREASED REDUNDANCY: Just about all the major players in the server DASD subsystem market have delivered RAID
(Worldwide figures)

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Hewlett-Packard	$124.8M	18.6%
AT&T Global Information Solutions	$95M	14.1%
IBM	$38.9M	5.8%
Storage Dimensions	$31.5M	4.7%
Micropolis	$25.8M	3.8%
Digital	$23.8M	3.5%
Sanyo Icon International	$20.4M	3%
Storage Solutions	$13.5M	2%
Core International	$10M	1.5%
Other	$18.9M	2.9%
TOTAL	$672.1M	100%

Source: International Data Corp., Framingham, Mass.

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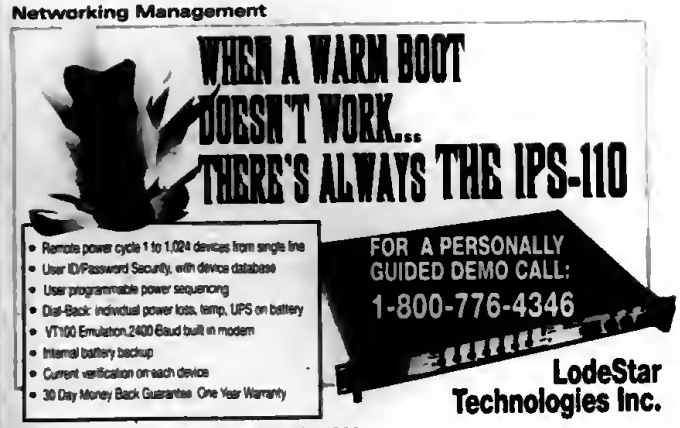

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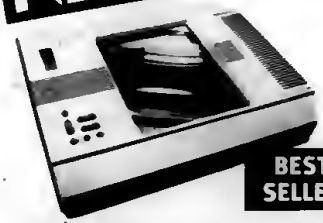

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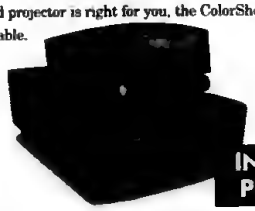

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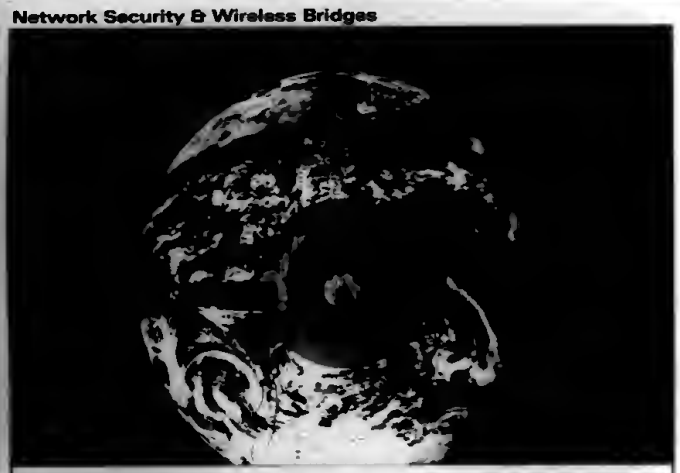

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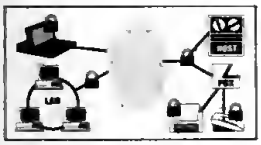

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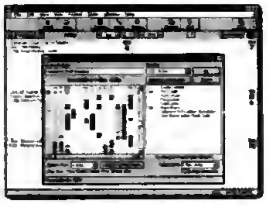

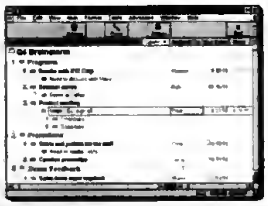

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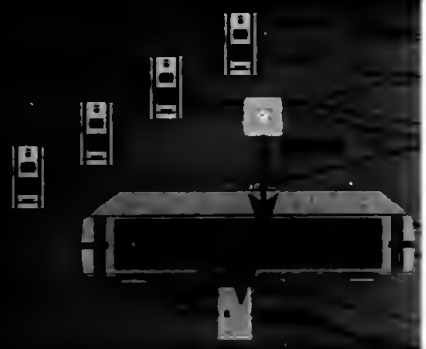

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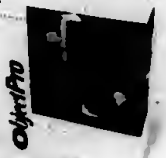

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Jan. 27 Stock Ticker

Gainers / Losers

Percent

Gainers		Losers	
Intelligent Info. Systems	48.8	Network Systems Corp.	-31.7
Software Spectrum Inc.	32.8	Storage Technology	-30.3
Penril DataComm Networks	31.4	Stratus Computer Inc.	-27.2
CE Software	23.1	Software Publishing Corp.	-22.6
Compression Labs Inc.	17.2	Printronix Inc.	-16.1
Intergraph Corp.	15.7	Ross Systems	-12.5
Radius Inc.	13.9	Legent Corp.	-16.3
Cheritronics Corp.	13.5	Timzic Corp.	-13.4

Dollar

Gainers		Losers	
Software Spectrum Inc.	5.25	Stratus Computer Inc.	-10.63
Bell Atlantic Corp.	4.13	Storage Technology	-9.50
Lotus Development	3.75	Legent Corp.	-5.88
U S West Inc.	3.50	Compaq Computer Corp.	-5.38
Bellsouth Corp.	3.50	US Robotics (H)	-4.63
GTE Corp.	3.00	Printronix Inc.	-4.13
LSI Logic Corp.	2.50	Compuware Corp.	-4.06
Nynex Corp.	3.50	Dell Computer Corp.	-4.00

[redacted]

Where are they now?

One year after initial public offerings (IPO) in the technology sector began in decline, how have the companies that succeeded in making deals in the fourth quarter of 1993 fared?

While most of the companies closed last Friday at the same or close to their IPO price, two stand out in particular for their dramatic change in value.

Beaverton, Ore.-based **Planar Systems, Inc. (PLNR)**, for example, has more than tripled in value since it went public. The company is involved in the development and manufacture of electroluminescent (EL) flat-panel displays. According to Stephen Lidberg, a securities analyst at "Red Chip Review," a newsletter in Portland, Ore., EL is an underrecognized technology that poses a strong threat to LCDs, which have been in continuous short supply.

"A year ago people didn't quite understand the potential impact of EL," Lidberg said. "It's brighter and more rugged than LCD so it has much broader applications in industry. Planar's market for this unique technology is huge and growing."

Not so golden days

On the other end, **Golden Systems, Inc. (GLDN)** in Simi Valley, Calif., a maker of power supply units, plummeted to 25 cents a share from its initial offering of $7 per share. Compaq Computer Corp. delivered the fatal blow when it rejected a contract for $5 million worth of the company's product because of a manufacturing flaw.

There's more than a glimmer of hope for Golden on the horizon, however, said Ian Gilson, an analyst at Van Kasper & Co. in San Francisco. "Golden has been sick but is very alive and in the recovery room," he said, adding that Compaq has agreed to take back the reworked product. He also said there are reportedly several agreements pending with other large companies.

It comes as no surprise that most of the IPOs saw little or no growth, according to Michael Keitz, vice president of Keitz Investment Management in Philadelphia. "Only about 25% to 30% of IPOs are above their initial offering price two years later," Keitz said. *—Erin Callaway*

IPO-lar opposites

THESE COMPANIES WERE ABLE TO CAPTURE INVESTORS' ATTENTION IN 1993'S FOURTH-QUARTER IPO DROUGHT; ONE YEAR LATER, THEY ARE ON OPPOSITE ENDS OF THE SPECTRUM.

Company	IPO price	Today's price
Golden Systems, Inc.	7	1 7/16
Planar Systems, Inc.	7	24 1/8

Communications and Network Services

Exch	52-Week Range		Company	Jan. 27 3 pm	Wk Net Change	Wk Pct Change
OTC	53.25	20.13	3COM Corp.	47.25	1.88	3.8
NYS	44.13	36.25	Ameritech Corp.	44.13	1.38	3.2
NYS	57.13	47.25	AT&T	49.75	0.88	1.8
OTC	19.75	12.75	Banyan Systems Inc.	16.88	-1.38	-2.5
OTC	43.88	18.63	Bay Networks Inc.	29.63	-1.25	-4.0
NYS	58.50	48.50	Bell Atlantic Corp.	54.88	4.13	8.1
NYS	63.50	50.50	Bellsouth Corp.	58.25	3.50	6.2
NYS	21.50	10.00	Bolt, Beranek & Newman	16.00	0.25	1.6
OTC	15.75	9.00	Brooktrout Technology	11.13	0.38	3.5
NYS	53.00	33.06	Cabletron Systems	40.00	2.38	-5.6
OTC	43.00	10.00	Centigram Communications	14.00	1.25	9.8
OTC	50.50	21.00	Chipcom Corp.	65.81	-1.63	-3.7
OTC	40.25	18.75	Cisco Systems Inc.	33.75	1.50	3.9
OTC	14.50	6.13	Compression Labs Inc.	8.50	1.25	17.2
OTC	12.50	5.13	Computer Network Tech.	8.03	0.13	1.9
OTC	25.75	7.50	CrossComm	13.25	0.00	0.0
OTC	3.50	2.00	Data Switch Corp.	3.19	-0.08	-1.9
OTC	38.25	37.88	DSC Communications	33.38	-3.00	-8.2
OTC	71.50	30.00	FORE Systems Inc.	64.75	-2.50	-3.7
NYS	35.88	10.00	General Datacomm Inds.	24.75	-3.75	-13.2
NYS	34.75	29.50	GTE Corp.	34.00	3.00	9.7
NYS	95.97	77.00	ITT Corp.	89.75	-1.00	-1.1
OTC	27.88	17.25	MCI Communications Corp.	17.88	-0.75	-4.0
OTC	15.75	2.63	MICOM Communications Corp.	8.00	0.00	0.0
OTC	12.63	4.50	Microcom Inc.	11.13	-0.13	-1.1
OTC	10.50	4.00	Netrix Corp.	9.63	0.00	0.0
OTC	8.75	3.25	Network Computing Devices	4.25	-0.50	-10.5
NYS	27.75	7.38	Network Equipment Tech.	24.25	-0.63	-2.5
OTC	27.13	13.88	Network General	25.25	0.75	3.1
OTC	9.50	5.38	Network Systems Corp.	5.38	-2.50	-31.7
NYS	68.75	26.50	Newbridge Networks Corp.	37.50	0.75	2.0
NYS	37.75	26.00	Northern Telecom Ltd.	34.63	1.63	4.9
OTC	26.63	13.50	Novell Inc.	18.00	-0.31	-1.7
NYS	41.50	33.25	Nynex Corp.	38.75	2.38	6.5
OTC	30.00	15.50	Octel Communications Corp.	21.50	0.63	3.0
OTC	36.25	10.75	Optical Data Systems Inc.	33.50	0.50	-1.5
OTC	7.50	2.13	Penril DataComm Networks	2.88	0.69	31.4
OTC	26.13	10.00	PictureTel Corp. (H)	24.00	-1.25	5.0
OTC	8.13	2.13	Proteon Inc. (H)	7.63	0.13	-1.6
OTC	14.50	2.75	Racotek Inc.	3.50	0.13	3.7
OTC	11.00	3.25	Retix	3.88	0.00	0.0
NYS	33.25	12.44	Scientific Atlanta Inc.	19.88	0.13	0.6
NYS	44.50	36.75	Southwestern Bell Corp.	42.88	2.00	4.9
NYS	40.13	35.00	Sprint Corp.	30.50	1.00	3.4
OTC	31.50	13.38	Standard Microsystems Corp. (H)	30.00	0.13	0.4
OTC	63.25	6.50	Stratacom Inc.	36.63	-1.00	-2.7
OTC	15.25	3.88	Telebit Corp.	5.00	-0.13	2.4
OTC	55.25	24.00	US Robotics (H)	48.75	4.63	-8.7
NYS	44.00	34.63	U S West Inc.	39.13	3.50	9.8
OTC	28.25	12.75	Xircom	15.88	-0.13	-0.8
OTC	37.00	8.00	Xylogics Inc.	25.25	0.50	2.0

PCs and Workstations

Exch	52-Week Range		Company	Jan. 27 3 pm	Wk Net Change	Wk Pct Change
OTC	7.50	3.50	Advanced Logic Research	4.66	-0.50	9.3
OTC	48.00	24.63	Apple Computer Inc.	39.75	-3.25	7.6
OTC	33.00	10.50	AST Research Inc.	14.25	-1.25	-8.1
NYS	44.38	27.78	Compaq Computer Corp.	36.88	5.50	-13.0
OTC	62.75	19.13	Dell Computer Corp.	41.50	-4.00	6.0
OTC	25.25	9.25	Gateway 2000 Inc.	22.00	2.50	9.7
NYS	507.50	71.80	Hewlett Packard Co.	102.13	-2.63	-2.5
NYS	33.60	18.75	Silicon Graphics (H)	50.50	2.63	8.0
OTC	37.63	18.75	Sun Microsystems Inc.	32.38	-0.63	-1.9
NYS	53.50	30.75	Tandy Corp.	45.63	3.13	6.4
OTC	11.75	2.50	Zeos International Ltd.	10.00	0.00	0.0

Large Systems

Exch	52-Week Range		Company	Jan. 27 3 pm	Wk Net Change	Wk Pct Change
ASE	12.00	5.75	Amdahl Corp.	10.38	1.00	-6.8
NYS	8.00	4.50	Convex Computer	7.25	-0.38	-4.0
OTC	3.75	0.50	Cray Computer	1.25	-0.09	7.0
NYS	39.75	14.63	Cray Research Inc.	34.88	3.38	8.5
NYS	12.00	6.63	Data General Corp.	9.75	-0.25	2.8
NYS	50.75	18.75	Digital Equipment Corp.	32.00	-3.13	-8.9
OTC	6.50	2.44	Encore Computer Corp.	2.75	-0.38	12.0
OTC	17.50	6.50	Harris Computer Systems Cor.	13.25	-0.50	-3.9
NYS	77.25	51.38	IBM	71.75	3.50	-4.7
OTC	13.25	5.00	NetFrame	5.88	-0.50	7.8
OTC	13.75	3.63	Parallan Computer	5.50	-0.13	-2.3
OTC	16.00	9.50	Pyramid Technology	33.75	0.00	5.9
OTC	21.25	11.13	Sequent Computer Sys.	37.00	1.88	9.9
OTC	6.84	3.13	Sequoia Systems Inc.	3.75	0.06	1.7
NYS	39.88	12.88	Stratus Computer Inc.	28.50	-10.63	-27.2
NYS	39.75	10.50	Tandem Computers Inc.	17.75	-0.63	-3.4
OTC	23.50	3.88	TriCord Systems	6.00	0.25	4.3
NYS	16.50	8.75	Unisys Corp.	9.00	0.00	0.0

Software

Exch	52-Week Range		Company	Jan. 27 3 pm	Wk Net Change	Wk Pct Change
OTC	38.50	21.50	Adobe Systems Inc.	30.13	0.13	0.4
OTC	8.50	2.50	American Software Inc.	2.75	0.00	0.0
OTC	41.50	31.88	Autodesk Inc.	33.50	-0.13	-0.4
OTC	4.11	1.75	Bachman Info. Systems	4.13	-0.25	-5.7
OTC	29.00	20.50	BGS Systems Inc.	24.50	-0.50	-1.5
OTC	21.00	40.25	BMC Software Inc.	56.69	-2.75	4.6
OTC	27.75	15.00	Boole & Babbage Inc.	37.75	0.75	2.8
OTC	15.13	6.00	Borland Int'l Inc.	7.50	-0.50	-6.3
OTC	24.25	6.00	Brock Control Systems Inc.	8.25	-0.50	-7.6
OTC	4.00	1.50	CE Software	3.00	0.56	23.1
ASE	50.34	6.25	Cheyenne Software Inc.	14.38	-0.75	-5.0
OTC	18.88	9.75	Cognos Inc.	37.00	-0.25	-1.4
NYS	55.00	27.50	Computer Associates (H)	51.63	1.50	2.8
NYS	5.50	2.50	Computervision Corp.	4.88	0.25	5.4
OTC	69.25	25.00	Compuware Corp.	37.00	4.08	9.9
OTC	17.25	9.00	Comshare Inc. (H)	16.00	1.25	8.5
OTC	16.75	10.66	Corel Corp.	11.13	1.50	11.9
OTC	14.25	7.25	Dataware Technologies Inc.	11.50	0.00	0.0
OTC	6.75	2.25	Easel Corp.	1.61	-0.25	-6.5
OTC	33.00	14.25	FileNet Corp. (H)	30.75	2.25	7.9
OTC	21.25	3.00	4th Dimension	4.25	0.03	0.7
OTC	19.25	8.13	Frame Technology	18.50	0.00	0.0
OTC	35.25	11.50	FTP Software Inc.	28.00	3.00	0.7
OTC	11.00	7.00	Group 1 Software	9.25	0.00	0.0
OTC	21.75	6.75	Gupta	11.75	-0.75	0.0
OTC	10.88	5.13	Hogan Systems Inc.	6.00	-0.50	5.0
OTC	40.50	18.00	HNRS	36.88	-2.13	-5.4
OTC	39.75	11.25	Information Resources	14.75	0.00	0.0
OTC	33.75	14.25	Informix Corp.	31.38	0.50	1.2
OTC	11.25	7.50	Intergraph Corp.	10.13	1.50	15.7
OTC	8.75	2.50	Interleaf Inc.	4.13	0.25	6.5
OTC	18.25	6.63	Intersolv Inc.	14.50	-2.13	-7.2
OTC	73.25	27.00	Intuit Inc.	65.50	-1.75	2.6
OTC	37.25	19.00	Legent Corp.	30.25	5.88	16.3
OTC	86.50	29.75	Lotus Development	44.63	3.75	9.2
OTC	17.75	4.50	Magic Software Enterprises	4.88	-0.25	-4.9
OTC	15.50	6.00	Manugistics Group Inc.	8.75	-0.63	-6.7
OTC	27.50	14.75	Mapinfo Corp.	25.25	1.00	4.1
OTC	6.88	1.44	MathSoft	2.25	-0.13	-5.3
OTC	20.25	6.50	McAfee Associates	16.63	-2.13	-11.1
OTC	17.25	9.50	Mentor Graphics	13.75	-0.13	0.9
OTC	20.00	11.50	Micro Focus	13.63	0.75	5.8
OTC	11.63	4.63	Micrografx Inc.	6.63	-0.75	-10.2
OTC	65.35	39.00	Microsoft Corp.	59.75	-2.13	3.6
OTC	45.00	11.25	NetManage Inc.	41.25	2.25	5.8
OTC	46.50	26.75	Oracle Corp.	42.50	-1.44	3.3
OTC	40.25	31.50	Parametric Technology	38.25	-0.63	1.6
OTC	26.50	13.50	ParcPlace Systems Inc.	18.00	1.06	-5.6
OTC	39.50	13.00	PeopleSoft	31.63	-3.93	10.1
OTC	8.50	4.13	Phoenix Technologies	7.44	-0.56	-2.0
OTC	87.25	35.50	Powersoft	71.49	5.00	5.0
OTC	14.75	3.50	Platinum Software	8.88	0.25	3.7
OTC	24.25	10.00	Platinum Technology	22.75	-0.63	-2.7
OTC	56.75	27.00	Progress Software Corp.	48.75	1.50	3.1
OTC	4.13	1.88	Quarterdeck Office Sys.	3.38	-0.03	-0.9
OTC	24.00	9.50	Rainbow Technologies Inc.	15.50	0.50	3.3
OTC	9.25	2.00	Rasterops	3.75	-0.25	-6.3
OTC	7.13	2.80	Ross Systems	4.13	-0.88	17.5
OTC	20.50	0.50	Sapiens Int'l. Corp. N.V.	1.13	0.03	2.9
OTC	27.25	9.25	Softkey International Inc.	24.00	1.50	6.9
OTC	7.25	3.00	Software Publishing Corp.	4.00	-1.19	-22.6
OTC	10.00	5.00	State of the Art	9.30	-0.44	-4.6
NYS	50.38	25.00	Sterling Software Inc.	36.00	-0.50	-1.4
OTC	16.50	3.63	Structural Dynamics Research	6.50	-0.25	3.7
OTC	57.00	35.75	Sybase Inc.	44.88	2.63	-5.5
OTC	21.13	9.88	Symantec Corp.	20.00	1.00	5.3
OTC	50.50	33.00	SynOptics	45.75	1.50	3.2
OTC	28.00	10.63	System Software Assoc.	17.13	-0.25	1.5
OTC	6.13	3.25	Timzic Corp.	5.24	0.03	13.4
OTC	50.00	7.88	Viewlogic Systems	9.61	1.11	13.2
OTC	23.25	12.25	VMark Software Inc.	16.50	1.00	5.7
OTC	13.25	5.60	Walker Interactive Systems	9.00	0.50	6.0
OTC	60.00	29.25	Wall Data Inc.	50.00	1.75	4.9

Semiconductors

Exch	52-Week Range		Company	Jan. 27 3 pm	Wk Net Change	Wk Pct Change
NYS	37.25	20.13	Advanced Micro Devices	30.11	1.38	4.4
NYS	24.50	16.10	Analog Devices Inc.	31.25	-0.88	4.9
OTC	37.63	17.94	Atmel Corp.	33.00	-0.25	-0.8
OTC	8.88	1.41	Chips and Technologies	7.00	-0.88	-11.1
OTC	44.63	31.00	Cirrus Logic	28.13	3.25	8.7
NYS	26.88	11.88	Cypress Semiconductor Corp.	21.75	-1.00	-7.3
NYS	20.13	13.38	Dallas Semiconductor	15.61	0.25	1.6
OTC	31.50	14.75	Integrated Silicon Systems	17.00	-0.75	-2.7
OTC	73.50	56.00	Intel Corp.	71.35	1.88	2.7
NYS	45.38	16.75	LSI Logic Corp.	43.88	3.50	6.0
OTC	22.75	14.25	Lattice Semiconductor (H)	12.75	1.13	5.2
NYS	47.50	22.75	Micron Technology (H)	45.00	-0.50	1.1
NYS	63.13	43.13	Motorola Inc.	60.13	-1.25	-2.0
NYS	25.00	16.50	National Semiconductor	18.13	1.25	-6.5
OTC	18.75	6.75	Sierra Semiconductor	58.13	0.88	5.1
NYS	80.50	61.25	Texas Instruments	70.21	3.50	-4.0
OTC	16.50	10.25	VLSI Technology	12.88	-0.50	-2.8
OTC	9.50	1.78	Weitek	3.44	-0.19	-7.1
ASE	20.50	11.00	Western Digital Corp.	15.61	-0.50	-2.3
OTC	63.75	29.00	Xilinx	58.75	0.50	0.8
OTC	37.75	26.75	Zilog Inc.	58.25	-0.88	-2.9

Peripherals and Subsystems

Exch	52-Week Range		Company	Jan. 27 3 pm	Wk Net Change	Wk Pct Change
OTC	30.50	14.50	American Power Conversion	15.61	-0.25	1.6
OTC	37.25	17.25	Banctec Inc. (L)	18.13	0.13	0.7
OTC	5.75	1.75	Cambex Corp.	3.75	0.13	3.4
ASE	5.00	1.38	Cognitronics Corp.	2.03	0.31	18.5
NYS	20.50	9.00	Conner Peripherals	10.88	-0.11	1.1
OTC	34.00	9.75	Creative Technologies Inc.	11.38	0.80	7.0
OTC	11.00	3.50	Data Race Inc.	7.00	-0.38	-5.1
ASE	8.50	4.13	Dataram Corp.	7.00	0.13	1.8
NYS	24.00	12.38	EMC Corp.	18.13	1.88	0.4
OTC	35.00	3.13	Emulex Corp.	13.00	-0.44	3.2
OTC	31.00	11.25	Evans & Sutherland	13.00	0.00	0.0
OTC	26.00	14.00	Exabyte	18.25	0.25	1.6
OTC	26.25	1.88	Intelligent Info. Systems	3.81	1.25	48.8
OTC	5.50	1.59	Iomega Corp.	4.75	-0.06	1.3
OTC	9.75	2.00	IPL Systems Inc.	2.50	-0.50	13.6
OTC	29.50	17.88	Komag Inc.	24.25	3.75	-10.2
OTC	8.63	2.63	Maxtor Corp.	5.50	-0.25	-4.3
OTC	11.50	[illegible]	Micropolis Corp. (H)	8.88	-0.38	1.7
OTC	28.25	9.25	Pinnacle Micro Inc.	12.50	0.50	4.2
OTC	28.25	6.31	Printronix Inc.	50.63	-0.33	16.1
NYS	10.75	6.88	QMS Inc.	8.50	-0.13	1.5
OTC	20.25	11.63	Quantum Corp.	14.25	-0.88	-5.0
OTC	18.25	7.50	Radius Inc.	16.38	1.75	13.9
NYS	14.63	6.50	Recognition International	8.00	0.00	0.0
OTC	7.00	4.13	Rexon Inc. (H)	6.25	0.31	4.6
OTC	28.75	18.64	Seagate Technology	25.50	1.00	4.0
NYS	41.50	21.00	Storage Technology	21.08	-9.50	30.3
NYS	40.50	24.88	Tektronix Inc.	34.50	-2.75	7.4
NYS	111.75	90.41	Xerox Corp.	104.13	0.50	0.5

Services

Exch	52-Week Range		Company	Jan. 27 3 pm	Wk Net Change	Wk Pct Change
OTC	19.88	12.06	American Mgmt. Systems	16.13	0.50	2.9
NYS	6.25	1.75	Anacomp Inc.	1.88	0.00	0.0
OTC	21.75	10.50	Analysts Int'l.	50.50	-0.25	-1.2
NYS	61.63	47.63	Auto Data Processing	50.75	0.00	0.0
OTC	34.25	16.00	Cambridge Tech. Partners	33.00	0.00	0.0
NYS	20.88	20.50	Ceridian Corp. (H)	28.63	0.00	0.0
NYS	35.13	17.75	Comdisco Inc. (H)	33.13	1.25	5.2
OTC	30.00	8.25	Computer Horizons	16.50	-0.50	2.9
NYS	52.63	34.25	Computer Sciences	48.88	0.88	1.8
NYS	10.38	6.75	Computer Task Group	8.61	0.00	0.0
NYS	33.25	6.75	CompUSA Inc.	17.86	-0.13	3.9
OTC	11.50	5.50	Control Data Systems Inc.	6.61	0.50	8.2
OTC	33.13	0.13	Egghead Discount Software	31.00	-0.50	4.8
NYS	39.50	28.88	General Motors E (EDS)	38.13	0.25	0.7
OTC	33.00	6.88	Inacom Corp.	8.50	0.00	0.0
OTC	37.50	7.50	Intelligent Electronics	9.50	-0.56	5.6
OTC	22.50	6.25	Merisel	6.75	-0.50	-6.9
OTC	32.50	9.25	Microage Inc.	12.88	-0.13	-1.0
OTC	82.00	38.50	Paychex	39.25	1.25	3.3
NYS	47.75	25.75	Policy Management Sys.	43.00	-1.00	-2.4
NYS	28.25	19.75	Reynolds and Reynolds	24.00	-0.50	-1.9
OTC	35.25	16.75	SEI Corp.	17.75	1.25	-6.6
OTC	34.63	33.13	Shared Medical Systems (H)	32.00	1.50	-4.4
OTC	8.13	4.00	SHL Systemhouse	5.50	-0.06	-1.1
OTC	31.25	8.25	Software Spectrum Inc.	31.38	5.25	32.8

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

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EMC works RAID into Symmetrix

CONTINUED FROM PAGE 1

praised the flexibility promised by EMC's mix-and-match RAID strategy. The Hopkinton, Mass., company may be the first mainframe disk vendor to offer that in one array, although Amdahl Corp. and Encore Computer Corp. are jointly working on a similar product, analysts said.

"Given the choice between a box that was flexible and a box that was not, I'd take the box that was flexible," said John Marshall, team leader for capacity planning and mainframe storage at General Accident Insurance of America in Philadelphia. "You might want to fully mirror some portions of your data, but for others, you don't need that kind of protection" or the extra cost it demands, Marshall added. He now has about 500G bytes of Symmetrix capacity installed.

"You don't always need everything done the same way," agreed Bill Rasmussen, vice president of the information services department at North Pacific Insurance Co. in Portland, Ore. EMC does a good job of "trying to build what the market says it wants, and that's been pretty successful for them," he said.

However, some observers expressed wariness about the potential impact on performance from EMC's plan to use RAID Level 4 technology as the underpinning of the RAID-S offering. In RAID Level 4, the parity data used to reconstruct files after a disk crash is written to a dedicated platter, whereas the more common RAID Level 5 approach spreads the parity information across all of the drives in a drawer.

RAID Level 4 "is something I would have to look at from scratch," Marshall said. "I have no experience with that at all." He added that General Accident's interest in making use of the RAID-S capability would depend heavily on how it performed compared with mirrored configurations of Symmetrix.

Tossing the cache around

Paul Wolfstaetter, an analyst at Gartner Group, Inc. in Stamford, Conn., said RAID Level 4 "normally would have a worse write penalty" than RAID Level 5. However, he added that EMC hopes to alleviate that through its usual strategy of throwing large amounts of cache onto the Symmetrix arrays.

Dick Blaschke, vice president of mainframe product marketing at EMC, said there will be "no comparison" between mirrored Symmetrix performance and RAID-S throughput. But he claimed RAID-S "is not going to be any worse" than competing RAID Level 5 and above arrays such as IBM's Ramac and Storage Technology Corp.'s Iceberg 9200.

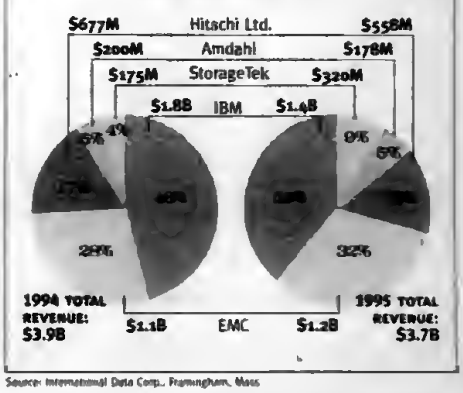
The RAID-S approach required less of an architectural change for EMC, and users will not have to rewrite data as extensively as with RAID Level 5, Blaschke said. But disks will have to be swapped out to go to RAID-S because the RAID logic will be embedded in a chip at the drive level rather than within the Symmetrix controller. That also should help minimize performance penalties, he added.

"There will be some disruption for customers, no question. But I think EMC is going to mask that disruption pretty nicely," said Carl Greiner, an analyst at Meta Group, Inc. in Stamford, Conn. He added that the mix-and-match strategy should keep Symmetrix "in the forefront" of mainframe array functionality.

RAID goes radical. See CW Guide page 77.

Closing the gap

Projected worldwide mainframe disk storage market share by revenue



Source: International Data Corp., Framingham, Mass.

An army of RAID

Next Tuesday will be a busy day for mainframe RAID array watchers. Sources said Hitachi Data Systems Corp. plans to introduce a promised RAID Level 5 subsystem on Feb. 7, a date that was already penciled in for Storage Technology to unveil details on its upcoming Kodiak array.

But users should not expect to see either very soon. Analysts said both products are expected to ship in the third quarter, the same time that EMC's RAID-S implementation is supposed to hit the market. HDS would not comment, while StorageTek said only that it expects to deliver Kodiak to an initial beta site this quarter.

Kodiak is expected to reach capacities of a terabyte and act as a more general-purpose alternative to StorageTek's Iceberg 9200 array, sources said. Meanwhile, HDS' product should be in the 750G-byte range, with performance similar to that of EMC's Symmetrix arrays, they added.

"Hitachi has been trying to push outdated 3390 technology against EMC for over a year, and they've clearly lost," falling behind upstart EMC in market share, said David Vellante, an analyst at International Data Corp. in Framingham, Mass. But the new product "clearly puts Hitachi right back in the ball game," he added.

When it ships, that is. George Sekeley, president of the information systems unit at CSX Corp. in Richmond, Va., said HDS must also get more aggressive on pricing. "They have fabulous gear, but they just haven't been able to come with the right price for me," he said. *—Craig Stedman*

NT Server

CONTINUED FROM PAGE 1

cal company. "It gives me another powerful server platform option, and it means I'm no longer relegated to Intel Corp.-based processors."

Hankering for power

Bob Sakakeeny, an analyst at Aberdeen Group in Boston, agreed, noting that many of the businesses he has spoken with recently are eager to install more powerful processors.

"Users who are currently running NT Server 3.5 on a Silicon Graphics, Inc. Mips [Technologies] machine or a Digital Equipment Corp. Alpha processor are drooling over the performance. NT Server is a screamer on these boxes, and users can expect the same type of performance boost with the PowerPC platform," Sakakeeny said.

"This type of power is the reason that NT Server 3.5 is winning against OS/2 as an application and database server and is starting to eat into departmental-level Unix machines as well," Sakakeeny added.

The upcoming support for the PowerPC platform now leaves Hewlett-Packard Co. with the lone high-end processor not supported by NT Server, Sakakeeny said.

Besides the new features, the NT Server 3.51 upgrade will also remove the current limitation that allows applications to cache only 256M bytes of memory per transaction, Nash said.

The 256M-byte cache limitation could become a problem for users with very large database applications.

"It's not a huge architectural problem," Nash said. "In NT Server 3.51, Microsoft will increase the work set [or currently mapped virtual address space] limit from the current 256M bytes to 2G bytes. This will allow customers to run applications utilizing the full 2G bytes of address space in the working set."

Some NT Server 3.5 users such as Jim Snively, systems consultant at Sun Company, Inc. in Philadelphia, said they had not come up against the 256M-byte caching limitation.

"Overall, I've been very pleased with NT Server and haven't run into any performance problems or issues," Snively said.

Not perfect

Snively and Dugger did say there were a few outstanding "wish list" features they would like Microsoft to incorporate in future NT Server releases. For instance, they said they would like automatic disk quota functionality and a utility that would clean up disks in the aftermath of a virus.

"I'd love to see automatic disk quotas as a preventive measure that blocks users from storing files before, and not after, we run out of disk space. Right now, if we run out of disk space, we have to manually go back and clean things up," Snively said.

Sources close to Microsoft said the company has no plans to produce disk quotas and will rely on third-party support to deliver this functionality.

DOS is everywhere in Windows 95. See page 42.

NT Server 3.51 to sport support

The next release of Windows NT Server 3.51 will incorporate support for the following:

- The IBM PowerPC platform, although it will not support a hot-plug capability.
- Windows 95 common controls and help desk support interfaces that will make NT applications look like Windows 95 applications.
- File compression for Windows NT File Services.
- Increased performance and multithreading capabilities for Object Linking and Embedding and Win Sockets applications.
- New video drivers for Compaq Computer Corp.'s Qvision 2000, Tseng Labs, Inc.'s W32a and Matrox Electronic Systems Ltd.'s MGA/Impression Plus video cards.

—Laura DiDio

INDUSTRY PULSE: Object technologies

Save time and gain productivity

Users will move to object technology faster once industry standards are adopted and commercial tools and class libraries become more widely available

Reasons to move to object technology		Object-oriented applications currently in use	
36%	Improve programmer productivity	42%	Information retrieval
33%	Reduce time to market	33%	Transaction processing
31%	Enchance software quality	30%	Decision support
28%	Increase software reuse	28%	Groupware
24%	Reduce maintenance costs	26%	Scientific/Engineering
16%	Save in software costs	25%	Modeling
13%	Increase user productivity	18%	Process Control
Base: 404 object technology users (multiple responses allowed)		Base: 236 object technology users (multiple responses allowed)	

Source: Market Perspective, Inc. a 1994 Object World San Francisco Survey

Worldwide object-oriented tools revenue

	1993	1996*	1995*	1996*	1997*	1998*
Object databases	$76M	$144M	$269M	$491M	$885M	$1.4B
Analysis & design tools	$38M	$63M	$100M	$151M	$215M	$290M
Programming tools	$319M	$449M	$624M	$887M	$1.3B	$2.2B

Source: International Data Corp., Framingham, Mass. *Projected

Objects in action

Object-oriented programming provides higher productivity, reliability and availability, but it faces a high learning curve

Productivity improvement with Smalltalk object programming:

	Original task	With Smalltalk
Development time	19 months	3.5 months
Labor months	152	10.4
Lines of code	265,000 lines of PL/1	22,000 lines of Smalltalk

Object databases are used mainly in technical applications, but they are attracting attention in the insurance industry and IS departments

Use an object database for an application if:

- The application has complex data structures and data types
- There are many relationships between data structures
- The relationships are as important as the data
- High performance is required for data manipulation
- Behavior modeling is as important as data modeling

Source: International Data Corp., Framingham, Mass.

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Inside Lines

Warped minds want to know

OS/2 has only been married to IBM's other software operations for three weeks, but already it is making them change their errant ways. Just last fall, the CICS folks at IBM promised that a Windows NT version of the transaction monitor would be introduced in early 1995 as an alternative to CICS for OS/2. The NT product does, in fact, exist, but IBM no longer plans to make a public fuss about it, CICS officials said. "You're clearly going to see IBM software operations working in a more coordinated way," said CICS strategy manager Geoff Sharman.

This Tiger ain't burnin' so bright

Microsoft finally began its long-awaited Seattle-area tests of its "Tiger" Media Server, but don't expect to be ordering pizza and Supersonics tickets over your TV any time soon. The test, which began six months late, is in only about five homes. At that rate, yours will be installed sometime in the next century. So for now, better let your fingers do the walking. Can you say "interactive television," children?

Powwow in 100VG-land

Proponents of 100VG-AnyLAN are hosting a forum today in San Francisco to drum up support for the fledgling 100M bit/sec. networking technology, which faces fierce competition from "fast" Ethernet and low-speed ATM technology. Reports that IBM's love for 100VG-AnyLan is waning are not helping matters. Several analysts report that behind closed doors, Big Blue — one of the first companies to jump on the 100VG bandwagon — is pushing its own 25M bit/sec. ATM over 100VG-AnyLAN. IBM denies this, however.

This New Era needs some character

Informix will succumb to customer demand for a character-based version of its spiffy new development tool, New Era, according to a user group leader who was briefed by the company. Informix officials plan to surprise the sales staff with the news this week at an annual companywide meeting in Nashville. Sales reps "have been pretty beaten up about this issue" by users, the group leader said.

Clueless in the parallel universe

Users might be able to take advantage of a bit of confusion surrounding IBM's new parallel, clustered CMOS hardware systems. The architecture has thrown some people for a loop when negotiating contracts for software to run on the big machines. IBM's so-called sysplex design can split processing among a cluster of computers, which can make it difficult to determine how much vendors should charge for packages for the platform. One contract negotiator at a large mainframe software vendor admitted last week, "We have no clue how to price that at all."

About that fine print...

Computer Associates is ready to take its relationship with Hewlett-Packard a step further, but sources say HP wants to smooth out some rough spots in the contract language first. Apparently, the pair were poised to announce a deal in which they'd cross-sell and coordinate development of their systems and network management packages. Under the deal, CA-Unicenter would be even more closely integrated with HP's OpenView package — the better to manage CA's Ingres database environment, for example. But HP is balking over product positioning concerns, sources close to CA said. Officials at both vendors declined to comment.

Sick and tired of hearing about the I-way, infobahn and National Information Infrastructure? So are members of the Boston Users Group, who took a poll and came up with what they consider a preferable alternative. Their choice: "Shirley." Go figure. In the meantime, feel free to come up with news tips or tidbits for Computerworld and then call our 24-hour voice-mail tip line at (508) 820-8555 or our toll-free number at (800) 343-6474. News Editor Maryfran Johnson can be reached by phone at (508) 820-8179, via the Internet at mjohnson@cw.com or through MCI Mail at 590-8017.

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